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CONTENTS

ORIGINAL ARTICLES

PETERSON, REUBEN, M. D., and ZWALUWENBURG, JAMES G., M. D., Ann Arbor.—Experiences with Pneumoperitoneal X-Ray as an Aid to Gynecological Diagnosis 415

NEW, G. B., M. D., Rochester.—The Relation of Nasopharyngeal Malignancy to other Diagnosis 419

MURRAY, WILLIAM R., M. D., Minneapolis.—Diagnosis and Indications for Operation in Acute Mastoiditis 422

STALEY, JOHN C., M. D., St. Paul.—Sacro-Coccygeal Dermoids..... 428

SHASTID, THOMAS HALL, M. D., Duluth.—A Plea for Better Refraction Work and for Muscle Training..... 432

BENEDICT, W. L., M. D., Rochester.—The Treatment of Trachoma..... 437

WANOUS, ERNEST Z., M. D., Minneapolis.—Problems of the Fallopian Tube Infection Period 441

HENRICI, A. T., M. D., and E. L. GARDNER, M. D., Minneapolis.—A Case of Pulmonary Infection with a New Species of Acid-fast Actinomyces..... 443

BARLOW, ROY A., M. D., Rochester.—The Value of Conservative Intranasal Draining for Empyema of the Antrum 445

CORBETT, J. F., M. D., Minneapolis,—Traumatic Injuries of the Spinal Cord and Roots 446

(Continued on Advertising Page III.)

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MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association

VOL. IV JULY, 1921 No. 7

ORIGINAL ARTICLES

EXPERIENCES WITH PNEUMOPERITONEAL X-RAY AS AN AID TO GYNECOLOGICAL DIAGNOSIS

(Preliminary Report)

REUBEN PETERSON, M. D.
Ann Arbor, Michigan.

and

JAMES G. VAN ZWALUWENBURG, M. D.
Ann Arbor, Michigan.

The studies which form the basis of this communication were undertaken at the University Hospital by Doctor James G. Van Zwaluwenburg, Professor of Roentgenology, and myself with the idea of improving gynecological diagnosis, if possible, by x-ray pictures of the normal and pathological pelvis. A careful review of the literature on pneumoperitoneum and the x-ray convinced us that with the proper precautions and with a careful technique gas could be introduced into the abdominal and pelvic cavities without danger to the patients. It only remained to select and carry out a technique suitable for our own clinic to give the necessary time to the study of the pelvic conditions clinically and the x-ray plates prior to the time when the patients were operated upon and the final diagnosis made.

At the outset it may be remarked that the gynecologist is handicapped at the start in his study of the x-ray plates. In comparison with workers in other fields of surgery, he is not often called upon to utilize the x-ray and without such experience he is not competent to interpret what may be valuable pictorial illustrations of lesions he has been able to make out by his routine pelvic examination. In fact, without the cooperation of an expert roentgenologist it would have been utterly impossible for this work to have been carried on with any hope of success.

Inasmuch as our main efforts from the gynecological standpoint have been to improve preoperative diagnosis, the following plan has been adopted and carried out in practically all the cases. After a complete history, the patient was subjected to a most careful and painstaking bimanual examination and the exact findings recorded. Whenever possible a clinical diagnosis was made from these findings and this in turn carefully recorded. The patient was then inflated with the gas and the x-ray plate or plates taken in the examining room in the manner to be later described. These plates were then read in the x-ray laboratory and the findings recorded without consultation with the clinician. Prior to examination under anesthesia and operation, however, the plates were carefully studied by Doctor Van Zwaluwenburg and myself with the idea of reconciling the recorded clinical and x-ray findings and discussing the diagnoses which in some cases were similar but in many instances were quite wide apart.

Prior to the operation the patient was subjected to a most careful examination under anesthesia and the results of this examination recorded. Care was taken to record only what was felt by bimanual touch, uninfluenced by the x-ray findings. For example, if the x-ray showed an adherent right tube and ovary unrevealed by examination under anesthesia, such a condition was not recorded.

As a final step in the study, the exact condition of the various pelvic organs was noted when the abdomen was opened and carefully described, so as to compare the actual pelvic conditions with the appearances of the x-ray plate. The removed pathological organs were photographed as nearly as possible as they lay in the pelvis and these photographs in turn studied in connection with the x-ray plates.

It must be borne in mind that this is a prelimi-

*Read before the Southern Minnesota Medical Association, Mankato, November, 1920.

nary report of a work which can not be said to be fairly started. In comparison with the thousands and tens of thousands of gastro-intestinal x-ray examinations and the opportunities for the study of such plates and the conclusions to be drawn therefrom, our work with its small number of cases furnishes insufficient data from which to draw conclusions. However, this much may be stated. Starting as an experiment and a rather doubtful experiment at that, the clinicians now would relinquish only with the utmost regret this most important and interesting aid to gynecological diagnosis. The more our studies have been pursued, the more enthusiastic have we become.

Another advantage of this combined diagnostic endeavor has been the marked improvement in the carefulness with which the clinical examination and diagnosis are made by all members of the staff. It is no longer considered good form in the clinic to state there is a "mass" to one or the other side of the uterus, especially when one knows that the x-ray may unravel this "mass" and make of it an enlarged tube with a comparatively normal ovary. The outstanding feature of the combination of carefully recorded clinical examinations and x-ray pictures of the pelvis is the tendency to do away with slip-shod methods. No longer will it do to state that the pelvis is tender on bimanual examination and contains something, just what will be ascertained when the abdomen is opened. The resuts of the examination may be wrong or only partially correct, but at least they bear the ear marks of an attempt to make a diagnosis and in this way win the respect of the x-ray department which is not afraid to record its deductions drawn from careful study of the plates.

As the purpose of this communication is to show by lantern slides what has been accomplished by pneumoperitoneal x-ray as an aid to pelvic diagnosis, I will content myself with giving you a summary of our present technique, which is far different from that employed in our first investigations.

We use carbon dioxide gas in preference to oxygen. The reasons for changing to this gas were that the discomfort to the patient of distending the abdomen enough to separate the soft tissues, pelvic and abdominal, and sufficient to give the best x-ray plates, was greater and more persistent when oxygen was employed. Oxygen is but slowly absorbed by the peritoneum with the result that the patient may be distressed for hours and at times for a day or two.

When carbon dioxid gas is used, while the distress in proportion to the amount used is just as great as with oxygen, the discomfort is very temporary, the gas being absorbed within fifteen minutes to half an hour after the inflation. This quick absorption is disadvantageous in another way since it necessitates exceedingly rapid work in plate taking. Delay with the x-ray apparatus may means failure even if a liter or more of the gas has been introduced. Patients are able to walk to the ward or out of the hospital without discomfort within half an hour after the inflation.

In our experience with nearly one hundred inflations of either oxygen or carbon dioxide gas into the abdominal cavity either by the transuterine of transperitoneal route, no signs of peritoneal irritation produced by the gas have been observed. This coincides with the experience of Stein and Stewart and other workers in this field.

For obvious reasons no inflation should be performed in acute abdominal or pelvic conditions. Failure to observe ordinary precaution in this regard may give rise to acute flare-ups, just as we see an elevation of temperature after thorough bimanual examinations of patients with acute or subacute pelvic inflammatory conditions.

The needle used for transperitoneal inflation is the one commonly employed for spinal puncture. The site of the puncture is just below the umbilicus and in the median line unless such site is contraindicated by probable bowel adhesions at this point. No intestines have been perforated.

Schleich's solution is used for the skin and underlying tissues down to the fascia prior to the passage of the needle.

The needle is passed only a short distance through the peritoneum. Its passage through the latter can be detected after a little experience. If there be any difficulty in the passage of the gas through the needle it is easily overcome by having the patient take a few long breaths.

The amount of gas at an inflation should be accurately measured by a gasometer and the pressure estimated by a manometer. The apparatus employed is almost identical with that utilized by Rubin for transuterine inflation of the pelvic cavity by way of the fallopian tubes. Instead of the crude estimation of the amount inflated by means of the rubber bag advocated by Stein and Stewart and others, the flow of gas can be regulated from the tank by the number of excursions of the gasometer and the amount of gas passing at each excursion. The greater the number of excursions, the more rapidly the gas is passing and the higher the pressure if there be the same resistance to the passage of the gas.

To insure success of the x-ray plate of pelvic organs the patient must be so placed as to allow the gas to rise upward and displace the pelvic organs and force the intestinal coils out of the pelvis. After many trials with different positions we are securing the best results from the moderate knee chest position with an inclined board beneath the thighs with a notch cut out for the pubes. The table is then tipped as for the Trendelenburg position and the patient prevented from slipping by shoulder straps.

"An 18 inch square of opaque fabric with a 6.5 inch circular hole cut out of its center is laid on the buttocks and serves as a diaphragm. A plate changing tunnel is then placed horizontally on the table, double screen films are used, and a Coolidge portable unit, operating in the ordinary lamp circuit furnishes the x-ray. An exposure of from fourteen to twenty seconds is required and ordinarily each exposure is interrupted, being made at such intervals as the breath can be held conveniently and the patient allowed to breathe between the fractional exposures."

As a routine procedure in suitable cases the transuterine method of inflation is attempted first and if the tubes be found permeable, from a liter to a liter and a half of gas is allowed to pass into the abdominal cavity through the uterine cannula. If the tubes are impermeable to a pressure of 200 millimeters the cannula is withdrawn and the inflation brought about by the transperitoneal route. Naturally there will be far from a few cases where for various reasons it will be preferable to chose the transperitoneal route at the outset. However, in our experience, as well as that of Rubin with over one hundred cases of inflation by the transuterine route, the theoretical danger of forcing infectious material from the tubes into the pelvic cavity does not exist. However, this will be discussed at some length in a subsequent paper.

Just as Rubin has found that smaller and smaller amounts of gas can be demonstrated by the fluoroscope and the x-ray after transuterine inflation, 150 cubic centimeters usually being sufficient, so are we convinced that good x-ray results will be obtained by smaller and smaller quantities of gas. A correct position such as already described will give a good plate with from 500 to 1000 cubic centimeters of gas, whereas with a faulty position 2 or 3 liters may be necessary. Other things being equal, since the ordinary patient does not begin to suffer discomfort or even feel the effects of the inflation until about 500 cubic centimeters have been introduced, it should be the aim to so manage the technique that the inflation will not go beyond this quantity and possibly fall short of it.

After the lantern slides I ask to be permitted to summarize what has been accomplished thus far by the combined clinical and x-ray study of pelvic lesions.

1. The normal uterus together with tubes and ovaries can be clearly demonstrated by the pneumoperitoneal x-ray plate.

2. Owing to the distension with gas the tubes are rather more clearly demonstrated where the inflation has taken place through the uterus than transperitoneally.

3. Irregularities of the uterus are quite as fully, if not more clearly, shown by the x-ray than made out by bimanual examination.

4. With the improved position (knee chest and Trendelenburg) the pelvis will be shown clear of bowel coils. Retention of such coils in the pelvis will be proof that intestinal adhesions are present.

5. In not a few instances the diseased and enlarged appendages are more clearly outlined by the x-ray than can be made out by the most careful and searching bimanual examinations.

6. In certain cases of flaccid tubes or where the tubes are plastered against the pelvic walls by adhesions, the x-ray is more valuable than bimanual examination as regards diagnosis.

7. It is not beyond the range of possibility that with improved technique and experience, early cases of pregnancy can be definitely determined by the x-ray before such a procedure is possible by the examining finger.

8. The above are not conclusions but suggestions to be considered in connection with the subject under discussion. Further experience may change our views.

9. In conclusion the bimanual examination and x-ray plate after inflation of the pelvis by gas, are not antagonistic methods of diagnosis. They are each valuable and their value is enhanced if they are used in conjunction, each acting as a check upon the other.

DISCUSSION

DR. JENNINGS C. LITZENBERG, Minneapolis: I hesitate to discuss a subject concerning which I know nothing, but that great American letter writer, Dr. Schmitt, of Mankato, wrote me after I had refused to discuss the paper on the ground that I had had no experience with the procedure, so I had to yield to his importunities and convincing arguments.

Seriously speaking, there is one phase of this paper about which I am an authority, and that is mistakes in diagnosis in plevic examinations as revealed at the operating table.

I forgot to add in my preliminary remarks that before I consented to discuss the paper I wrote to Dr. Peterson and asked him if he would send his conclusions, and perhaps a copy of his paper so that I could study and discuss it. He replied, "All I know about the subject is contained in the abstract in the program." I thought that if he did not know any more than that about the subject, I probably could discuss it. (Laughter.)

I share with you, I am sure, the enthusiasm manifested after listening to Dr. Peterson's paper, because we have an opportunity offered to us for improving our diagnosis. If there is anything the true physician ought to hail, it is an addition to his accuracy in diagnosis, for we make enough mistakes after we think we are skilled.

We hear teachers of gynecology say to the students (I have done it myself), "educate your fingers so that you will have eyes in the ends of them." I have found difficulty in getting the eyes in those fingers to converge. After making thousands of examinations a man thinks that he can make a diagnosis only to find at the time of operation that his diagnosis was wrong.

I met in the halls of the university a student who was coming from the gynecological clinic. After having had an hour or two there he was full of enthusiasm for he had made a diagnosis. After having tried to feel something in the pelvis, he finally had found the uterus. (Laughter.) Meeting him in the hall he could not restrain his enthusiasm and he said, "Doctor, I just had the greatest day of my life at the clinic; I palpated the uterus." (Laughter). I made the remark that it takes a long time to educate the fingers to know what one feels in the pelvis, and the student replied, "Yes, doctor, it took me a long time." (Laughter.)

When I saw these roentgenograms of Dr. Peterson's and realized that we have another aid to overcome these now inevitable mistakes I was impressed, because these mistakes as related by Dr. Peterson are by men who have been at the game for thirty years, men who, if the things could be felt, could feel them. Now that we have another aid we ought to hail it with enthusiasm.

I have hesitated more on account of skepticism than anything else about the safety of this procedure. I am convinced, after what Dr. Peterson has said. I have read some of the other papers on the procedure, and I have been a little skeptical knowing that fluids have been injected into the uterus, have gone into the tube, and septic material might produce bad results. But if we get bad results in a few cases, as probably we may, a procedure that will reveal things like the last picture has shown, is certainly of value. I believe that we have here a procedure which we must all try out if it only gives us a little aid.

A few years ago we depended upon the x-ray to tell us absolutely what was the matter. We know now the x-ray does not tell us absolutely about a fracture, but nevertheless the x-ray has gained in value in every field, and it has been our regret that it has not been of more value in our field, and if we could try it out commonly, I am sure it will be a great aid to our diagnoses, and certainly we need it in the pelvis.

DR. R. E. FARR, Minneapolis: I regret that I did not hear the first part of Dr. Peterson's paper. For some time past I have been doing pneumoperitoneums and I want to discuss two or three points. The injection through the uterus may have certain advantages and is probably safe, providing the proper precautions are taken. Of course, one gets the same results by making the injection through the abdominal wall, aside from the evidence in relation to the tubes. The work under local anesthesia shows that the needle may be introduced repeatedly into the peritoneal cavity without causing any harm. The point of injection should be anesthetized with local anesthesia and deflation should be made through the same point, if it is thought desirable. We first used oxygen and found that, after 36 hours or two days, when we opened the abdomen there would be a considerable amount of gas present. Carbon dioxide is absorbed much more readily. The pneumatic injector is used by us for producing pneumoperitoneum, employing the following technic: 1 cylinder is first filled with sterile water and then evacuated by pressure from the oxygen or carbon dioxide tank. This gives us a glass cylinder filled with filtered gas. The injection is directly under control of the cut-off and may be made under any pressure desired.

DR. PETERSON (closing the discussion): I have very little to say in closing. What Dr. Litzenberg said about the medical student reminds me of one of my students in a short course we were giving in gynecologic diagnosis. I had this man come down to examine the pelvis, and after he had made a careful examination I asked him what he had found, and he replied, "I found a tubercle bacillus on the left ovary."

I can only remark that when you begin this work you can feel more than you can after some thirty years' experience.

We started out by using the bag as advocated by Stein and Stewart, but we are not satisfied with it, because we could not tell how much gas was passing into the peritoneal cavity except in a general way. With a bag that holds three liters, held between the knees of an assistant, pressure enough can be exerted to force gas into the abdominal cavity. But it was a rather rough method of estimating how much gas is passing into the cavity. The apparatus we use now is not at all complicated. With Rubin's apparatus, we have an accurate estimate of how much gas is passing, and we can tell under what pressure it is passing. This is also necessary where you are passing gas through the uterus and tubes. In some experiments I have conducted with the uterus and tubes after removal, I found that 250 or 300 millimeters of pressure could be used without rupture, but in order to be on the safe side, one does not want to pass gas under that pressure. We have found that if the gas will pass through the tubes it will pass under a pressure of 200 millimeters. We have tried this with the patient under the anesthetic at the operation, and we have demonstrated how much pressure is necessary very satisfactorily. If one will try the apparatus we are using now I think he will not go back to the gas bag advocated by Stein and Stewart.

I was interested in what Dr. Farr said relative to the pneumatic injector, and I would like to try that out in connection with our apparatus. As I stated in my paper, the method is simply on trial. It is something to improve our diagnoses if we can. We are doing it under the greatest precautions. I think after a year or two years or maybe three years we will be able to show things in the pelvis prior to operation that are not possible now and that we never dreamed of seeing before. If we can do that, we will be amply repaid for the time we have devoted to this work.

THE RELATION OF NASOPHARYNGEAL MALIGNANCY TO OTHER DIAGNOSIS*

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Rochester, Minnesota.

I have been impressed with the lack of nasal symptoms in some of the cases of malignant disease of the nasopharynx and the frequency with which such growths have been overlooked in the patients who come to the Clinic for diagnosis. These malignant tumors include sarcoma and epitheliomas but not the fibromas and myxomas. The patient's complaint may be pain in the ear or over the face and head, gradual loss of hearing, drooping eyelid, seeing double, nasal obstruction, or an enlarged gland of the neck. Very often general examinations, including those of the eye, ear, nose, and throat, and in some cases the neurologic examinations, have been made, but the very small malignant growth usually high in the vault or lateral wall of the nasopharynx above the eustachian tube has been overlooked. In order to emphasize the importance of a very careful examination of the nasopharynx in cases in which tumor in this region might be the cause of the patient's symptoms, I am reviewing the symptomatology of forty-six malignant tumors of the nasopharynx which I have examined at the Mayo Clinic during the last four years (1915 to 1919).

TYPE OF TUMOR

	Cases
Epithelioma	22
Sarcoma	14
Malignant (type of cell not determined)	7
No pathology	3
	46

AGE OF PATIENTS

10 to 20 years	9
21 to 30 years	3
31 to 40 years	8
41 to 50 years	11
51 to 60 years	12
61 to 70 years	3
	46
Age of oldest	66
Age of youngest	5
Males	38
Females	8

Fifty per cent of malignant tumors of the nasopharynx occurred between the ages of 41 and 60. A review of the histories does not furnish any tie-

*Presented before the Congress of Ophthalmology, Otology, and Rhinology, Denver, July 24, 1920.

ologic factor or factors that might determine the cause of these tumors.

The symptoms varied in duration from five weeks to three years; they were pain, symptoms of the eye, symptoms of the ear, symptoms of the nose and nasopharynx, enlarged glands of the neck, and intracranial symptoms.

Seventeen only of the forty-six patients complained of pain, which varied from an ear-ache to a very severe pain, as if a hot iron were burning into the head. The pain was always on the affected side; extending over the frontal, temporal, and mastoid regions and down the neck. One patient complained of very severe pain just underneath the angle of the jaw, but usually it was diffuse and radiating over the head. In cases in which the gasserian ganglion or the second and third divisions of the fifth nerve were involved by direct extension of the tumor, sharp pain, similar to that in trifacial neuralgia, occurred and later numbness over this area. Dull constant headache was complained of in some cases.

One patient with an epithelioma of the nasopharynx had had a wisdom tooth removed from the upper jaw on account of a sharp shooting pain. This was the first symptom; later the pain was dull, and at the time the patient came for examination there was numbness over the face and temporal region. Some patients attribute the pain in the head to the enlargement of the glands of the neck and believe the pain over the head to be referred from the neck.

One patient complained of constant frontal and temporal headache on the right side and an enlarged gland in the neck for a year. He gave a positive history of lues, for which he had received specific treatment elsewhere. Since the pain was relieved temporarily, the treatment was continued. The patient had an epithelioma of the nasopharynx with gland involvement.

Ten patients had eye symptoms at the time of examination; the most common was drooping of the upper lid or seeing double, following an aching of the face for several months. One patient had a complete fixation of the eye with a ptosis of the upper eyelid caused by the direct extension of an epithelioma of the nasopharynx. One patient's chief complaint was dimness of vision, drooping of the upper eyelid, and numbness of the right side of the face; this had been coming on gradually for two years.

Eleven patients complained of their ears at the time of examination. One patient complained of fullness in the ear and back of it and slight deafness. One had had an inflammatory condition of the ear fifteen months before examination. Paracentesis had been done which had brought temporary relief. A septum operation was performed later, but the ear gradually became deaf. An epithelioma was found around and involving the eustachian tube. Gradually increasing deafness preceded by ringing and noises in the ear with earache at times was the complaint in one case.

Twenty-four patients had nasal and nasopharyngeal symptoms at the time of the examination other than the ear symptoms or pain. In nineteen of these, the complaint was nasal obstruction; in three, recurring attacks of bleeding; and in two, increasing nasal discharge. It is a suprising fact that there were nasal or nasopharyngeal symptoms in only twenty-four of the forty-six cases of malignancy of the nasopharynx. This was due to the locations and the superficial character of some of the growths, which appear in the vault or laterally in the nasopharynx above or involving the eustachian tube, and may be slow growing and of a very low type of malignancy. They are sometimes a flattened ulceration with a thickened border similar to that of the basal-cell epithelioma of the face. This may be true of the epithelioma or of the sarcoma. The sarcomas may fill the nasopharynx or pharynx and bulge the palate, causing dysphagia and dyspnea.

Thirty-two of the patients had enlarged glands of the cervical region at the time of examination. Eleven of these had operations elsewhere for glands of the neck, varying from excision of a single gland to a block dissection, without the primary focus being found. Three of these patients had had a miscroscopic diagnosis of endothelioma of the gland which was removed because a primary epithelioma was not found.

A clinical diagnosis of Hodgkin's disease was made eleswhere in three cases. Metastasis in the neck may be extensive from a small primary growth in the nasopharynx. Sometimes a huge mass in the neck may be present when the primary growth in the Rosenmüller fossa is not more than 1.25 cm. in diameter. The first gland involved in malignancy of the nasopharynx is usually high in the cervical region. Both sides of the neck may be involved.

Nine patients had had tonsillectomy because of enlarged glands of the neck, and four had had

teeth removed. Six had nasal operations, apparently without the discovery of malignant growth of the nasopharynx.

Three patients were treated for lues because they gave a positive Wassermann or a history of luetic infection. Two of these had lymphosarcomas from which the pathologist had examined a specimen for diagnosis and reported inflammatory tissue. Because of this luetic treatment was instituted and a diagnosis of gumma made. One or two negative reports on tissue removed from a possible lymphosarcoma of the nasopharynx or the pharynx should not be accepted as definite if the condition looks malignant as it is only by repeated examination of specimens in these conditions, especially in rapidly growing tumors, that the pathologist is able to make a definite diagnosis of lymposarcoma.

One patient who had an epithelioma of the nasopharynx was referred to the Clinic to have the posterior root of the gasserian ganglion cut for trifacial neuralgia. The growth had perforated through the skull and involved the gasserian ganglion and caused the symptoms (Case 205751).

One patient was operated on for pituitary tumor. The patient died and at necropsy the tumor was found to be a direct extension from a very active squamous-cell epithelioma of the nasopharynx that had perforated through the skull into the sella turcica.

One patient complained of dimness of vision, ptosis of the right upper eyelid, and numbness of the right side of the head. Examination of the eye suggested an intracranial disorder (Case 246-500).

SUMMARY

A study of the cases of malignant tumors of the nasopharynx shows that the symptomatology is variable and that in some cases of malignant glands of the neck the primary growth can be found only by a very careful examination of the nasopharynx. A tumor thought to be an endothelioma may have a primary growth in the nasopharynx. Patients with neurologic eye and ear symptoms in whom a nasopharyngeal growth may be the cause, should have nasopharyneal examination.

CASE REPORTS

ADENOCARCINOMA OF THE NASOPHARYNX INVOLVING THE ORBIT

Case 246500. Mrs. F. E. S., aged 36, was examined Sept. 23, 1918, because of dimness of vision of the right eye, numbness of the right side of the head, and ptosis of the right upper eyelid. The trouble had started two years and three months before, when she noticed ptosis of the right eyelid, this gradually became worse. A nasal operation was performed for the trouble and the patient thought she was somewhat improved. She had had a dull headache on the right side for the last six weeks. About four weeks before the examination she fell over a trunk, striking on the knee and head, and after that a small clot of blood had come from the back of the nose every morning. She had a feeling of numbness of the right side of the head and face and the right ear seemed stuffy and somewhat deaf. She also had earache at times.

The patient was 5 feet 6 inches tall. Her normal weight was 187 pounds, but at that time of examination she weighed 110.5 pounds; the loss has occurred in the last six months. The patient appeared to be well nourished. Examination showed ptosis of the right eyelid and palpable glands in the right cervical region. With the right eye the patient could detect moving objects; vision in the left eye was 6/4; the pupils were unequal. Both eyes reacted to direct and consensual light promptly and equally; the right was sluggish to accommodation. Proposis of the right eye was 3 mm., and the eye could not be closed completely. The right pupil did not dilate with cocain but dilated with homatropin. The right field showed central scotoma, smaller for larger test objects. The extra-ocular muscles were not involved. The ciliary muscle was active, suggesting intracranial disorder. The right optic nerve was atrophic. In the nasopharynx on the right side was an ulcerated area about 2.5 cm. in diameter.

The microscopic diagnosis was adenocarcinoma.

EPITHELIOMA OF THE NASOPHARYNX WITH METASTASIS TO THE CERVICAL GLANDS

Case 240626. Mr. T. A. M., aged 52, who was examined July 31, 1918, came because of recurring enlarged glands of the neck. The patient had been in good health until November, 1917, when he had an inflammatory condition of the ear. His earache was relieved by paracentesis. One month later a gland in the right cervical region became enlarged. In May, 1919, a surgeon removed the glands from the right side of the neck; epithelioma was diagnosed. No primary focus could be found. The tissue from the glands of the neck was sent to a patholgist and the diagnosis "endothelioma" returned. July, 1919, a second operation was performed for recurring enlargement of the glands of the right submaxillary region. Three weeks later another small gland was removed and Coolidge-tube treatment used. For seven months before examination a gland in the right cervical region gradually had been getting larger. The patient had not lost weight and had no general complaint.

The patient had scars on the right side of the neck from a previous operation and a scarred fixed mass about 6 cm. in diameter high over the right cervical region. Examination of the nasopharynx revealed a growth about 2.5 cm. in diameter of the left nasopharynx and eustachian tube. Tissue removed for diagnosis showed epithelioma.

EPITHELIOMA OF THE NASOPHARNYX INVOLVING THE GASSERIAN GANGLION, THE ORBIT, AND THE CERVICAL GLANDS

Case 305751. A man, aged 64, registered at the Clinic Feb. 9, 1920; he was referred here by a physician for cutting of the posterior root of the gasserian ganglion for trificial neuralgia. The patient's complaint began three years before examination as pain in the right ear with gradually increasing deafness. At first the pain came at intervals, but soon became continuous and extended over the right mastoid region and the right lower jaw and cheek. It was dull, aching, and constant, and was relieved by the use of aspirin. There had been a gradually increasing

obstruction of the right side of the nose which the patient attributed to a catarrhal condition which he had for many years.

One year before examination the patient had a deep alcohol injection of the second and third divisions of the fifth nerve; this did not give relief. He was then referred to a neurologist, who said that the lesion was central and advised the use of potassium iodid and massive doses of arsenic. No improvement followed this treatment. One month later an ulcer developed on the cornea of the right eye, and the lids of this eye were sutured together and the eye treated. Although the Wassermann test was repeatedly negative, the patient was given two injections of arsphenamin in August, 1919, with no improvement in his condition.

At the time the patient presented himself at the Clinic for examination, the pain extended over the right mastoid region, the temporal region, the lower jaw and cheek, and the frontal region on both sides. For the last few weeks the pain had so increased in severity that it was only relieved by the use of morphin.

Examination revealed partial obstruction of the right nostril by a polyp. It was impossible to examine the nasopharynx thoroughly by the routine method, but by the use of 10 per cent cocain and a retractor to draw forward the soft palate a more thorough examination was made. An area of ulceration 2 cm. in diameter was found in the right nasopharynx just above and involving the eustachian tube. The lesion was clinically malignant. Two firm glands, 2.2 cm. and 1 cm., respectively, in diameter, were found in the right cervical and submaxillary region. The roentgenogram showed a tumor mass extending from the region of the right nasopharynx up through the base of the skull. Examination of the eye showed a corneal opacity in the right eye, due to an old ulcer. The lids of this eye were adherent over the outer two-thirds of the palpebral fissure as a result of previous treatment. The patient was completely deaf in the right ear. The neurologist reported right gasserian ganglion involvement from extension of nasopharyneal tumor.

The pathologist's diagnosis of a specimen taken from the ulceration in the nasopharynx was squamous-cell epithelioma.

EPITHELIOMA OF THE NASOPHARYNX INVOLVING THE SELLA TURCICA

Case 216363. Mr. F. A. A., aged 33, was examined Dec. 11, 1917, for blindness in the right eye, stiffness of the neck, and headaches. The blindness had started in 1914. Within six months sight in the right eye had entirely disappeared. During this time he had some headache which usually came on in the evening. Up to three weeks before examination he had no discomfort and could see well with the left eye. He had a slight headache, vomited, and fell unconscious to the floor, remaining unconscious for an hour. The pain in the neck lasted until November, 1917, when the patient consulted a physician in Chicago, who did a lumbar puncture; the pain left suddenly and the patient felt reasonably well.

This patient had a neurologic examination, and diagnosis of a pituitary tumor was made. At the time of operation a tumor 2 cm. in diameter was snared out. The patient died following the operation. Postmortem examination revealed a large nasopharyngeal neoplasm growing up into the base of the skull and destroying the sella turcica. The pathologist's report was squamous-cell epithelioma.

EPITHELIOMA OF THE NASOPHARYNX WITH INVOLVEMENT OF THE THIRD AND SIXTH NERVES

Case 179436. Mr. R. J., aged 66, examined Dec. 4, 1916, came to the Clinic because of pain in the left side of the face and ptosis of the left upper lid. The ptosis was first noticed three months previously after the patient fell out of a buggy and injured the right side of the head. He got up again and drove four miles before he began to feel dizzy and left eyelid drooped. Following the accident pain persisted in the left side of the face and around the left ear. About the same time the patient noticed enlarged glands in both sides of the neck just below the ear. He had a severe cough the last three months, and at times some bleeding from the left nostril.

The patient was 5 feet 6 inches tall, poorly nourished, and weighed only 126 pounds; his normal weight was 150 pounds. Hard glands were palpable in the left submaxillary region and in the left cervical region. A gland in the left submaxillary region was also palpable. The left upper lid was ptotic and the left external rectus muscle paralyzed. A roentgenogram of the chest was negative. The Wassermann test was negative. Examination of the nasopharynx revealed an epithelioma on the left side of the nasopharynx with slight bulging of the soft palate.

DIAGNOSIS AND INDICATIONS FOR OPERATION IN ACUTE MASTOIDITIS*

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The diagnosis of acute mastoiditis may be exceedingly simple when the case presents the classical signs and symptoms of an acute mastoid involvement, with external changes over the region of the mastoid process, or the diagnostic signs and evidence of pathological changes within the mastoid antrum and cells may be so obscure as to make the diagnosis somewhat difficult. It is the latter class of cases that is sometimes overlooked and neglected, and the patient thereby subjected to the grave dangers of an intracranial complication or to the serious sequels of a chronic purulent otitis media resulting in marked permanent functional impairment of the middle ear.

A considerable proportion of cases of mastoid involvement do not present at any time the usual signs and symptoms of a mastoiditis, and it has been the experience of every aural surgeon to have operated many cases in which the direct signs of a mastoiditis have been obscure and to have found most extensive pathological changes present which, if not relieved by surgical measures, would have resulted in serious complications in a high percentage of cases. The absence of well known and easily recognized signs of mastoiditis is more likely to occur in adult cases than in children, and on account of the anatomical conditions present in

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the mastoid process in adult life, these masked cases of mastoid abscess assume a greater importance, and intracranial complications are more frequent, and delay in recognizing the indications for operation is more dangerous.

This becomes apparent when we consider the anatomy of the middle ear and mastoid in children and adults and the pathology of an acute middle ear infection. During childhood the mastoid cortex is thin and less resistent to pressure from within; infection is transmitted more readily through the cortex, periostitis and subperiosteal abscess are more likely to occur, and the presence of a patent squamomastoid suture, which is likely to be present until the age of two years and sometimes considerably later, serves as a pathway for the transmission of infection from the antrum to the cortex. In adult life and especially with advanced age, the mastoid cortex becomes hard and resistent due to osteosclerotic changes which occur, and unless there is free drainage from all the involved cells and antrum into the tympanic cavity and from the tympanic cavity through the membrana tympani, the infection is likely to extend in other directions than through the cortex and cause intracranial complications.

On account of the close anatomical relationship between the antrum and the tympanic cavity, it is doubtful if the antrum escapes infection in any severe acute purulent otitis media, and if we consider the antrum as a part of the middle ear, the presence of the classical signs of mastoiditis such as temperature, pain, tenderness, discharge and external changes over the mastoid bone, do not nessarily indicate a mastoiditis, at least they may not constitute an indication for operation. Such symptoms, including redness and swelling of the soft tissues over the mastoid, may be present early in the course of an acute purulent otitis media, especially in children, before drainage has taken place, through the drumhead. Free incision of the membrana tympani, with establishment of drainage, may result in the rapid subsidence of all uance or recurrences of these symptoms after drainuance of recurrences of these symptoms after drainage has been obtained from the middle ear that is of diagnostic importance and becomes an indication for operation.

In order to draw some conclusions as to the relative frequency of the various symptoms and objective signs of acute mastoiditis, I have reviewed one hundred operated cases. The ages were from three months to eighty-four years, and on account of the frequent different clinical manifestations of acute mastoiditis in children and adults, I have divided the cases into two groups: one group varying in age from three months to fifteen years and a second group from sixteen to eigthy-four years inclusive. The symptoms tabulated were present at the time of operation, after free drainage had been obtained through the membrana tympani, and had persisted or recurred to such a degree as to present indications for operation. In all cases pathological changes were found within the mastoid indicating the necessity for operation.

	3 mos.-15 yrs.	16-84 yrs.
Temperature	93.5%	76 %
Pain	21.8%	68 %
Tenderness	96 %	93.5%
External Mastoid Changes	54.3%	40.2%
Auditory Canal	33.3%	42 %
Discharge	93.5%	96 %
Streptococci	52.4%	58.8%
Pneumococci	19 %	26.5%
Staphylococci	28.6%	14.7%
Complications	13 %	24 %

Temperature varies greatly as a symptom of acute mastoiditis and when present, is usually of low degree, especially in adult cases. In the above series of cases it was present in children in 93.5 per cent and in adults in 76 per cent of the cases. It should be remembered that some cases of acute mastoid involvement do not show any temperature and the absence of temperature should not be taken as an indication that an acute mastoiditis is not present. In uncomplicated cases of acute mastoiditis in adults, temperature is seldom high and frequently drops to normal on the establishment of free drainage by incision or rupture of the membrana tympani. In children, temperature is in general higher than in adults, but extensive involvement of the mastoid may be present without temperature if drainage is free. A recurrence of temperature, with free tympanic drainage, is an important sign of extension of mastoid involvement, and a persistent low temperature, provided drainage is free and no other cause for temperature is present, may be the only apparent indication for operation.

Pain is a very variable symptom and in uncomplicated case of acute mastoiditis with free drainage from the mastoid cavities into the tympanum and from the tympanum into the external canal, it is not likely to be a prominent symptom, and extensive involvement of the mastoid process may be present, without the patient complaining of pain. The continuance of pain, however, after free drainage has been obtained through the drumhead,

is an indication that the mastoid is involved and that there is not free drainage between the areas of infection in the mastoid and the tympanic cavity, due probably to swelling of the mucous membrane lining the aditus ad antrum or the communications between the antrum and cells, thus blocking drainage. The occurrence of pain on cessation or diminution of discharge from the middle ear is also an indication of mastoid involvement unless the cessation of discharge is due to a sudden closure of the opening in the membrana tympani. The absence of pain is, therefore, not an indication that a mastoiditis is not present, and the presence of pain, especially after drainage has been obtained, is an indication that there is some mastoid involvement, and if it persists or increases in severity after 24 to 48 hours the mastoid should be opened. In the series of cases reviewed, pain was present in 21.8 per cent of the cases in children and in 68 per cent of adult cases.

Tenderness is a symptom that is much more commonly present and is probably the most reliable of all subjectives symptoms of acute mastoiditis, as nearly all cases will show some tenderness over some area of the mastoid.

The type of mastoid with which we have to deal will influence to a considerable extent the degree of tenderness present. In the pneumatic type with well developed cells and a comparatively thin cortex, the tenderness may be pronounced, while in mastoids with a thick, hard cortex, tenderness may not be elicited except by very firm pressure and in some cases it is absent entirely.

The value of tenderness as a diagnostic sign will depend upon the time which has elapsed since the onset of the acute otitis media, upon the presence or absence of free drainage from the tympanum, upon the location of the point of tenderness and whether or not the tenderness is a recurring one. During the early course of an acute otitis media, and especially before rupture or incision of the membrana tympani, tenderness can almost always be elicited by pressure on the tip of the mastoid and sometimes by pressure over the antrum. Tenderness at this stage of the middle ear infection, in the absence of other signs denoting mastoid involvement, is not an indication of acute mastoiditis and will probably rapidly disappear on obtaining free tympanic drainage by incising the drumhead. If tenderness persists for 48 hours, or increases, after incision of the drumhead with free drainage, it is an indication that the mastoid cells are involved and the safest procedure will be to obtain drainage externally through the mastoid process.

The location of the tenderness is of some importance. When located over the antrum or along the posterior portion of the mastoid process, it is more indicative of mastoiditis than when located at the tip.

Recurring tenderness is highly significant of acute mastoiditis. In the early stages of acute otitis media, tenderness of the mastoid may be present and subside in a day or two. If it then recurs and there is tympanic drainage present, operation is indicated if it persists for 24 to 48 hours, even though there are no other signs present indicating the necessity for opening the mastoid. It should be remembered that it is quite possible to have an extensive mastoid involvement without any sign of tenderness and absence of tenderness must not be considered an absolute sign that operation is not indicated. This is especially true in cases in which the mastoid cortex is thick or the mastoid is of the sclerotic type. A thick cortex is usually present in individuals beyond 40 years of age and delay in recognizing operative indications in such cases is especially dangerous as necrosis and infection within the mastoid bone is likely to extend inwards and cause complications. Tenderness could be demonstrated in 96 per cent of the cases in children and 93.5 per cent of the cases in adults.

External changes over the mastoid bone, when present, usually furnish positive indications for operation. It sometimes happens, however, that in the early stages of an acute otitis media, before the drumhead ruptures or when the drainage through the membrana tympani is insufficient, that external changes may occur, such as redness and edema, due to a periostitis. This is especially likely to occur in children and it often happens that thorough incision of the membrana tympani and the establishment of free drainage will be followed by the rapid subsidence of signs of mastoid involvement.

The presence of swelling and edema must be differentiated from a similar condition due to infection from the external auditory canal. In an external otitis there is swelling in the outer cartilaginous portion of the canal, with areas of tenderness on palpation and pain on movement of the auricle. When pus forms beneath the periosteum resulting in redness, swelling and sometimes fluct-

vation over the mastoid, the indication is to operate and to do a complete simple mastoidectomy. These external mastoid signs are more commonly present in children due to the relatively thin mastoid cortex through which the pus breaks; or, in infants and young children, to the presence of a patent squamomastoid suture which has not yet closed. The presence of a subperiosteal abcess is therefore quite frequent in acute mastoiditis occurring in young children and, while it usually means operation, if there are no urgent operative indications present, there is no great danger in delay for 24 to 48 hours, in order to obtain free drainage by incising the drumhead, as the opening through the vertex acts somewhat as a safety valve and lessens the danger of extension of infection to intracranial structures. For these reasons acute mastoiditis is usually considered less serious in early childhood, than in adult life, more especially when occurring in individuals beyond middle age. During adult life and especially in the aged, the cortex of the mastoid bone is hard and dense, the sutures are firmly united, and external changes over the mastoid are the exception. With other indications for operation present, to wait for external signs will subject the patient to the possibility of dangerous complications and is to be severely condemned. External changes over the mastoid bone were present in 54.3 per cent of the cases occurring in children and in 40.2 per cent of adult cases.

Changes occur at the inner end of the external auditory canal in a considerable proportion of cases, and, when present, are a valuable diagnostic sign of mastoid infection. These changes consist of a swelling or sagging of the superior and posterior wall of the canal in close proximity to the membrana tympani and indicate a periostitis which has extended from the infection in the tympanic cavity or is due to pus which has extended from infected mastoid cells. It is frequently an early sign of acute mastoiditis and is considered an operative indication. Such changes in the canal wall must be differentiated from an external otitis or furunculosis. In external otitis, the infection is in the outer cartilaginous portion of the canal and in mastoiditis the swelling is at the extreme inner end of the bony meatus and close to the membrana tympani. Such changes in the canal wall in close proximity to the drumhead were noted in children in 33.3 per cent and in adults in 42 per cent.

The character and duration of the aural discharge is often an important sign of mastoiditis. The quantity may be so great as to indicate that the source of discharge is not confined to the tympanic cavity but that the antrum and possibly the cells are also involved. A copious middle ear discharge does not of itself constitute an indication for operation unless it continues unduly long, (four or five weeks) with free tympanic drainage, in which case there is grave danger that the discharge may become chronic, and the seriousness of a chronic aural discharge can not be too strongly emphasized. A chronic purulent otitis media not only means a chronic mastoiditis with the possibility of complications, but it means the constant presence of a dangerous focus of infection, and it means the certainty of progressive impairment of the function of the middle ear.

There are some general considerations that frequently have an important influence upon our decision as to operative interference in acute mastoiditis. As the course of an acute infection depends quite largely upon the general and local resisting powers of the individual at the time of infection, and upon the virulency of the infecting organisms, it is evident that an acute otitis media or signs of an acute mastoid involvement occurring during the course of an acute or chronic infectious disease, have a graver significance than when the same middle ear or mastoid infection occurs in an otherwise normal individual. Closer observation and more radical measures for combating the infection are also demanded. That the importance of this has not always been recognized is shown by the large number of cases of chronic purulent otitis media which had their onset during or following an attack of scarlet fever, measles or influenza. In many of these cases, there were probably some signs of mastoiditis which subsided leaving a discharging ear or in some cases no other signs of a mastoid involvement than a profuse middle ear discharge which was allowed to continue. If after a reasonable length of time, with proper treatment, the discharge had not ceased, a simple mastoidectomy would probably have prevented the discharge from becoming chronic and would have restored the normal function of the middle ear. Exceptions to this sometimes occur, especially in scarlet fever, where the virulency of the infection is so great that rapid destruction of the membrana tympani takes place with necrosis of bone in the tympanic cavity. Examination of the discharge from the middle ear should be made to determine, if possible the

infecting organisms, as the virulency of the micro-organisms will often influence the course of the mastoid infection. The streptococcus is the most frequent infecting agent, and causes the most extensive bone destruction and the most serious complications. This is especially true of the streptococcus mucosus capsulatus which produces extensive bony necrosis and is frequently unaccompanied by any marked signs or symptoms indicating an extensive involvement of the mastoid. Pneumococcus also frequently causes a serious type of mastoiditis especially when complicating an attack of influenza. The staphylococcus is less virulent and less liable to cause serious complications.

In the series of cases reported, cultures made at the time of operation showed streptococci in 53.4 per cent in children and in 58.8 per cent in adults; pneumococci in 19 per cent of cases in children and in 26.5 per cent in adults, and staphylococci in 28.6 per cent of these cases operated in children and in 14.7 per cent of the adult cases.

Blood examinations are not of much value in uncomplicated mastoiditis. There is generally a moderate leucocytosis. A high poymorphonuclear percentage would indicate the passage of micro-organisms into venous circulation and would be suggestive of a sinus complication.

The x-ray is of value in mastoid diagnosis and will frequently give us valuable information as to the pathological changes which have occurred within the mastoid process. During the early stages of an acute mastoiditis, the radiograph will show a cloudiness over the areas of the mastoid cells. This does not constitute an indication for operation as it may be due to simple congestion of the mucous membrane lining the cells. If the plate shows that the septa between the cells are broken down or shadows indicating the collection of pus in definite areas of the bone, it will indicate the necessity of operation. The radiograph also furnishes valuable information as to the type of mastoid present, location of the lateral and sigmoid sinuses, the presence of zygomatic cells and it may be the means of diagnosing a perisinus or epidural abscess.

Symptoms of toxemia are sometimes present. Malaise, insomnia, restlessness, slight temperature, when occurring with free drainage from the tympanum, frequently mean an extensive mastoid involvement and are an indication for operation.

In the series reviewed, complications were present in 13 per cent of the cases in children and in 24 per cent of the cases in adults.

These complications are mentioned to show the frequency of such pathological conditions within the mastoid which are frequently found only at operation. The complications referred to include perisinus and epidural abscess, facial paralysis, labyrinthitis, abscess of the neck, sinus thrombosis and meningitis.

DISCUSSION

DR. H. I. LILLIE, Rochester: It occurs to me that this subject has been looked upon with too little attention by general men. In prevention of a surgical mastoiditis the indication is usually a thorough paracentesis in the acute stage of the otitis media.

The general picture of the patient is important. In forty per cent of the patients presenting themselves in the subacute stage, surgery will be definitely indicated. In the group that falls outside of that, the general picture shows the patient not doing well. He has had a discharging ear for several weeks He has felt incapacitated. He has had night pain. During the day he will feel somewhat better. This is the group in which the complications are liable to occur. The discharge in ordinary acute otitis media lasts from twelve to fourteen days. After a thorough paracentesis, if the discharge lasts longer than this time and continues to increase in amount, or at least does not diminish, we must be suspicious that we are dealing with more than a middle ear infection and that the appendages of the middle ear must be involved. Though operation is not indicated at once, still we must have that patient under observation because he has the type that is liable to fall into th surgical group.

The loss or impairment of hearing is a great disadvantage to the individual. It is an economic loss. Deaf people are likely to be morose and melancholy. At the present time in the east a movement is under way for the care of these people and it is bringing out a great many important psychological factors in the treatment. By doing on operation when it is indicated we can conserve the hearing function and we are doing a great deal for that patient. The operation itself in the uncomplicated cases is unattended by much mortality. In cases of mastoiditis in which operation is unduly delayed there is always more morbidity. The subacute stage, if patient is otherwise in good condition offers the most favorable time for operation as far as healing is concerned. It is not safe to merely open the cortex of the mastoid and allow drainage, because it is in this group where we have found the greatest number of extensions, that is, it is felt that the mastoid cells should be completely exenterated, thus insuring a cure and shortening the time of postoperative convalescence.

A thing I neglected to mention earlier, is the manner of eliciting tenderness over the mastoid process. I think it is very valuable to compare

both sides, that is, by putting the same amount of pressure on both sides we can tell if the patient is tender or not, whereas unless you do it that way a patient who is very sensitive about the ear is liable to make you believe he is tender where he really is not.

DR. J. A. PRATT, Minneapolis: I would like to mention two signs which I think are very important in the diagnosis of mastoiditis. One of them, which you will find in nearly every case, is the temporal pain on the side affected. The other is the pumping discharge that we get many times after the fourteenth day and beginning of the third week. When you have a very little discharge or a great deal of it and you wipe it out, if the discharge is pumping, you know that the antrum at least is affected. We have performed a great many operations which were diagnosed before operating simply on these two signs. The patient would have very little discharge but this pumping of the discharge through the perforation was present. I think these two signs were not mentioned, possibly they were, but we find them very prominent, particularly this temporal pain.

It seems hardly necessary to place too much importance on simple mastoidectomy. Using as we do, the electric burrs, we think no more of doing a simple mastoidectomy than we do of opening the frontal or exenterating the ethmoids intranasally. In our operative work we practically always send our patients home the day following the operation unless they have some other illness. Where we have a patient with a running ear for three weeks, that patient is operated if possible. In my opinion, if you operate early and not place so much importance on the operation because you have no chance of injuring the hearing, you can easily exenterate the entire mastoid and leave no chance of any future trouble.

DR. F. G. WATSON, Rushmore: I would like to lay emphasis on a point that Dr. Lillie made, simply that the best time to operate on acute mastoiditis is not in the very early stage. I have been called so often by the general practitioner in consultation just as soon as they find a little tenderness of the mastoid, sometimes before the drum was opened. The impression seems to have gained ground among practitioners that the moment there are any symptoms of acute mastoiditis you should open the mastoid. I think that is a mistake. Tenderness itself is not an indication that the mastoid should be opened. I think the pumping discharge which Dr. Pratt mentioned while a very strong indication of something wrong, perhaps in the presence of other symptoms, is not an indication that you should open that mastoid. If you will wait a few days after the acute symptoms have commenced, some antibodies will have formed in the tissues, then, if need be, the patient may be operated on.

I cannot agree with the idea of Dr. Pratt in letting patients go home the next day. There is some shock to any patient who has been under an anesthetic, and in the case of an adult I think that any operation that involves the use of an anesthetic for an hour or three-quarters of an hour the patient should be left in the hospital for a few days.

I have been struck by the fact that none of the speakers mentioned the x-ray in the diagnosis. I suppose that you are like myself disappointed by the aid received from the x-ray. The usual report the roentgenologist gives me is that there is a difference in the two sides, but beyond that he does not say. When a case has reached that stage, when you are able to make a diagnosis without the x-ray, then very often the x-ray will give you some information, but then you do not need it. When in doubt as to whether to operate the x-ray has not helped at all so far.

DR. C. H. MAYO, Rochester: I used to do quite a lot of work on the ear. It has always seemed to me that to open a mastoid is a simple matter.

The distinction I make is whether to perform an early drainage operation or a late extensive operation. In operating in these cases and in discussing them with other physicians, I have decided that in acute inflammation, the ear that does not discharge within thirty hours, with relief of pain should make us suspicious of mastoid trouble; if it is delayed in discharging forty-eight hours, we should be still more suspicious; if perforation for drainage is done and if the pain does not subside after this, then, as Dr. Pratt has said, the trouble must be in the mastoid. If the patient is seen in the late stages there is destruction. The diagnosis should be made early since it is then very easy to obtain drainage. Probably the greater number of specialists do not see the patients until late, and their writings, therefore, relate chiefly to the extensive operation, which appears so formidable that it deters other men from breaking early that little shell to establish drainage.

DR. A. R. COLVIN, St. Paul: I just want to report a case. There is one aspect of the mastoid question which appeals to the general surgeon, that is the question of infected fractures of the base of the brain. I saw several years ago a young man who had a fracture, which, according to the physical signs, extended from one ear to the other with a facial paresis on the left side and bleeding from both ears. He was unconscious for a while but recovered and finally at the end of ten days the left ear began to suppurate and in the course of a very short time he had a very high temperature and became delirious. There was some tenderness behind the ear on the left side. Exploration revealed a suppurating mastoiditis and an extradural abscess; recovery followed the evacuation of the pus.

Some few years later I saw an older man with a fracture of the base and a suppurating ear, also a suppurating mastoiditis, in both of these cases recovery followed the evacuation of the pus. Fractures of the base combined with bleeding ears should be regarded as compound fractures and in the light of these two experiences need not be regarded as hopeless because of infection.

DR. R. G. ALLISON, St. Paul: Dr. Murray did

not give the x-ray side of his diagnosis. I have had occasion to make x-rays on a number of cases that Dr. Murray and his associates operated on. I think Dr. Murray is a firm believer in the x-ray. In some cases in which I made the x-rays, I have advised operating at once and the operative findings confirmed my opinion. In other cases, thought it wiser to delay operation, and the results proved the correctness of the x-ray findings, I do not think I have sent them in on a single case where the mastoid was not involved.

The attitude taken by the men at the Manhattan Eye and Ear Hospital is that the x-ray is necessary to diagnosis. Dr. Fred Law, one of the best authorities on the mastoid, practically refuses to operate without an x-ray diagnosis. At Manhattan it was a revelation to me to see how the ear men relied on the x-ray. They divide their mastoids into first degree, which involves part of the cells; second degree in which there is an involvement of all the cells with a breaking down of the septa, and third degree, in which there is a breaking down of the cells with abscess formation. In acute mastoiditis the diagnosis is perfectly simple from the x-ray standpoint. The things that give you a great deal of difficulty are especially, differentiating the sclerotic mastoid from the infantile type. In the infantile type with its small cells and bad drainage, I am loathe about giving an opinion from an x-ray standpoint. I think you should be guided almost solely by your clinical symptoms, because with the slight drainage that takes place from these small cells, you can have the patient go to the bad very quickly. You can differentiate the involvement of the mastoid cells with the greatest of ease. I have yet to have a single mastoid that we passed up as being normal come to operation and show involvement of the cells.

DR. W. R. MURRAY, Minneapolis (closing): I am sorry that I was unable to finish my paper because I dwelt upon some of the points touched upon by the speakers. Dr. Lillie mentioned some of the symptoms indicating a toxemia. In some cases they may be the only symptoms that indicate mastoiditis and they frequently serve as an indication for operation. Such symptoms of toxemia are manifested by pain, feeling of malaise, low temperature, restlessness and insomnia. Sometimes we have to make our diagnosis entirely upon those symptoms.

In regard to the pulsation through the drum referred to by Dr. Pratt, I have never considered that a very strong sign in favor of operation for mastoid cases. We get that very frequently in the early stage of acute otitis media and it sometimes persists for some time. It is generally produced by pulsation in the circulation within the tympanum. It does indicate that as long as that continues the process is not undergoing resolution, but I do not believe we should consider it as an early indication for mastoidectomy.

In regard to the x-ray, I think that it is of a great deal of value. It is of a great deal of value in obscure cases and is sometimes the determining factor in operative work. In the early stages of acute otitis media and acute mastoiditis the x-ray will show a cloudiness through the mastoid cells, which does not indicate mastoiditis, at least it does not serve as an indication for operation, but if the x-ray shows a breaking down of the cells then you have a necrosis of the septa and once you get a necrosis of the septa it is doubtful whether the case will clear up without operation. The x-ray also indicates the location of the cells; it indicates whether there are zygomatic cells which may need to be opened; and it very often indicates the location of the lateral sinus.

I am glad to hear that Dr. Mayo favors early operation when operation indications are present.

SACRO-COCCYGEAL DERMOIDS*

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Sacro-coccygeal cysts are rare and are usually considered of interest only because of their infrequent occurrence and the obscure manner of their developement. Their presence on the posterior sacrum does not produce a disabling condition nor endanger life. However, when once a communication is establshied between the cyst and the surface of the skin, an intermittent irritating discharge continues until the affected area is excised. Cysts in this location have been mistaken for other conditions, among which are the various infections of the bones, including tuberculosis and pyogenic infections. The external opening of the fistula may be close to the sphincter ani and in that one respect resemble the sinus of perirectal abscess.

In addition to the simple dermoids there are several more complex tumors occuring in this region which are the result of misplaced fetal remnants. The literature concerning those anterior to the sacrum has been well reviewed by Law and by Lund. Those posterior to the sacrum are classified by Ewing as simple dermoids, complex demoids, teratoid tumors, terratomas and fetal implantations.

The following reported cases probably belong to the class of simple demoids as suggested by Mallory. By Tillman and others they are called epidermoids because of the absence of glands and hair follicles. The more complex tumors occurring in this region will not be discussed.

During the present year I have examined and operated upon four cases of persistent fistulae oc-

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curring upon the posterior surface of the sacrum or coccyx; the patients were all discharged soldiers and were assigned to the service of which Dr. A. R. Colvin is consultant.

CASE I: A. P. Age 25. Examined February 13, 1920. Family history, negative. Has never been ill with the exception of an occasional cold until the commencement of the present trouble. While on duty in France, in August, 1918, he noticed a small mass which could be felt under the skin at the lower end of his spine. This was lanced by a medical officer. The wound discharged a small amount of secretion until January 1, 1919, when the fistula closed. After closure the mass soon reappeared and was painful and tender. He was again operated upon January 31, 1919. In another Army hospital, he was reoperated on August 1, 1919, and again one week later. The wound continued to discharge and he was again operated upon December 1, 1919. The operations were all done under general anesthesia and he believes an incision was made and a drain inserted on each occasion. At the present time examination shows an indurated mass slightly smaller than a hen's egg over the posterior lower sacrum. A few drops of thin pus may be expressed from a small opening at the lower border of the mass just below the sacro-coccygeal junction.

Operation: An incision was made 3 inches long over the posterior surface of the sacrum to the tip of the coccyx. A probe was passed into the fistula and the mass, with the fistula, was dissected out. The upper portion of the wound was closed with silk worm gut. A small rubber drain was placed in the lower angle.

Patient discharged March 18, 1919. Cured.

CASE II: R. C. F. Age 24. Had measles and mumps when a child. Appendicitis at 14 years of age. Had remained well until October 1917, when he began to feel pain over the sacral region and noticed a small lump about the size of a marble. The pain lasted several days and disappeared. The lump remained about the same size until January 1, 1920, when it broke spontaneously. An intermittent discharge has kept up to the present time.

Examination: There is a small tumor the size of a walnut over the lower sacrum and upper coccyx. A fistula is present exactly in the midline just below the tumor. A probe passes upward and inward for about one inch.

Operation: February 27, 1920. Local anesthesia. An incision about three inches in length was made over the posterior lower sacrum ending at the tip of the coccyx. A probe was passed into the fistula and a small mass of indurated tissue, with the fistula, was dissected away from the sacrum at its lower extremity. In the bottom of the wound there was seen a small opening, in size about one-half the diameter of a lead pencil. A probe passed through this opening, went into the cavity of the lower sacrum. The canal of the sacrum was examined. The cavity was filled with a brownish granular detritus. The wound was closed with two silk-worm gut sutures with an intervening rubber drain.

Patient discharged March 13, 1920, wound entirely healed.

CASE III: A. E. Age 27. First seen February 6, 1920. Family history, negative. No illnesses since the diseases of childhood until the present trouble. In September, 1918, while riding on a truck, over a rough road, he was thrown upward and landed in a sitting posture on the posterior part of the seat, striking the end of the spine. The next day there was a swelling over the sacrum which has never disappeared. In March, 1919, he noticed a small amount of discharge from the lump. Since that time the discharge has kept up intermittently.

Examination: A fistula is present opening in the midline over the coccyx. It leads slightly upward, to the sacrum. The small mass is felt over the lower sacrum.

Operation: February 25, 1920. General anesthesia. An incision was made from the center of the coccyx unward 3-inches in the midline. A probe was passed into the fistula. After dissecting away the indurated mass a probe could be passed into the central canal of the sacrum at its lower extremity. The incision was continued in the midline exposing the canal with open lower lamina. The canal was found to be filled with a brownish detritus. The bone and periosteum show no sign of inflammation. Wound closed with silk worm gut. Rubber drain inserted between the sutures.

Discharged March 20, 1920, wound completely closed.

CASE IV: L. D. T. Age 35. Family history negative. Had pneumonia when a child. Received a minor wound in France in August, 1918. No other illness. First noticed a lump the size of a marble at the lower end of the spine January 1, 1920. A week later it became painful. Without consulting a physician he applied poultices which he says had the effect of producing a discharge which has continued intermittently since that time.

Examination: The opening of a fistula is seen in the midline over the lower coccyx. A probe passes upward 1.5 inches. A slight indurated area can be felt at the point where the probe is obstructed.

Operation: January 31, 1920. Dissection of indurated tissue and fistula made through a midline incision 3 inches long ending at the tip of the coccyx. Fistula does not lead into the sacral canal. Wound closed with silk worm gut. A small rubber drain inserted between sutures.

Discharged March 2, 1920, wound completely healed.

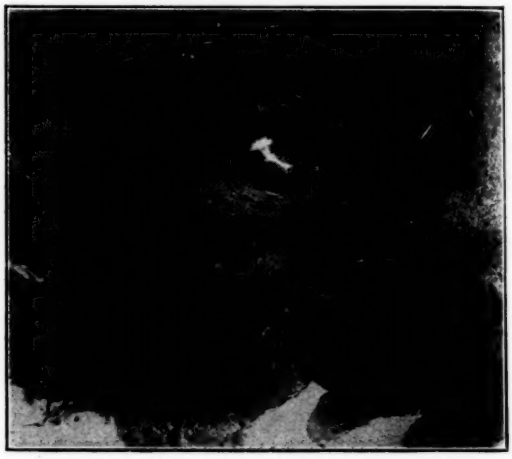
Literature with reference to this particular cyst is rather scanty. It appears that Mallory's work done in 1892 is the most comprehensive. He cross-sectioned the sacral region of a fetus of six months. There was found between the skin and sacrum a cavity lined with columnar and stratified epithelial cells. Microtome sections of the same

region were made in 7 cases, the youngest fetus being 3.5 months, the oldest, 6 months. Small open spaces of the same character were found in this region in all but one. The cyst contained no glands or hair follicles and because of that fact Mallory thought that the cysts probably could not have been derived from the skin. He considered the possibility of their being vestages of the medullary tube. This tube during the second month is found to lie in the center of the spinal cord. At this time the spine is growing more rapidly in length than the cord. So that there is an apparent retraction of the cord. The portion of the cord over the sacrum becomes fibrous and is the filum terminale of the adult. In this fibrous termination there are small open spaces lined with columnar epithelium. Mallory considers the possibility of cell remnants of this region being the antecedents of the cysts which he noted in the sacral region in 6 of the 7 fetuses examined. As pointed out by Mallory the cells lining the cysts he described, exactly resemble the pavement epithelium of the skin excepting only for the absence of glands and hair follicles. This seems to indicate a derivation of the cysts from the ectoderm.

According to Tillman the cysts are due to the development of displaced ectodermal cells of an earlier period, that is, from the second to the fourth week. Beginning in the human embryo about the 14th day, the medullary plate begins to sink below the surface of the ectoderm. The medullary tube is formed by the folding in of the sides and is closed from before backwards. After closure the tube lies below the fused edges of the ectoderm. During the fusion of these edges it is believed an opportunity is offered for the isolation of these groups of cells. The neurenteric canal leads from the posterior end of the medullary plate to the enteric canal. It is normally closed before the complete closure of the medullary tube. It is thought that cell remnants from this canal are the antecedents of cysts anterior to the sacrum and it has been suggested that its failure to completely close at its outer extremity may be the source of fistulae posterior to the sacrum and coccyx. It is an interesting fact that in the new-born there is to be seen many times a small depression or dimple in the soft parts over the coccyx in the mid-line. This is called the foves coccygea (Mallory, Romeaux). In the fetus, the depression, when seen, is deeper and may lead into a blind canal. There is a specimen in the collection of the University of Minnesota in which the canal is just wide enough to admit a fine probe and about 1 centimeter in length. There is nothing in the history of the cases that have come under my observation to show that the cysts were in any way related to these blind canals. Because of its location the patient obviously could not say whether or not a blind canal was present from infancy.

PATHOLOGY

The largest specimen removed was the size of a hen's egg,—the smallest the size of a marble. The tissue was hard, grayish white in appearance and of approximately the consistency of cartilage. The masses were not encapsulated, the indurated tissue merging with the surrounding soft parts. Microsopically there is seen the pictures of chronic



1. Low power of specimen removed from sacral region of adult male. Cut perpendicularly to the lumen of the sinus.

inflammation with fibrous connective tissue irregularly arranged and infiltrated with leucocytes, many of which are eosinophiles. There is an occasional group of foreign body giant cells. All evidence of a cyst wall has been destroyed by the inflammatory process. The fistula tracts averaged about 1.5 inches in length. In two cases the tract communicated with the cavity of the lower sacrum. From each of two cases a few dark hairs, about 1 inch in length were removed. Miscrosepoically the canal is seen to be lined by many layers of epithelial cells, stratified squamous on the surface merging to columnar at the periphery. Immediately beneath the epithelium is seen fibrous connective tissue with the fibres arranged for the most part concentriacally. At a distance this arrangement is

broken up. Everywhere there is an infiltration of the connective tissue with leucocytes, many of the eosinophile type. There is an occasional group of giant cells characterized by an unusual number of nuclei.

DIAGNOSIS

The condition is seen most frequently in young adults and in otherwise healthy individuals. In the nineteen cases collected by Mallory the average age was twenty-one years.

The fistulous opening when single is usually in the midline. It may be below the tip of the coccyx and close to the external sphincter. When found in that location the fistula may easily be mistaken for the sinus resulting from perirectal inflammation. The openings may be multiple, one above the other, or the tracts may extend outward from the midline under the subcutaneous tissue of the back or buttocks. Of the above mentioned cases collected by Mallory, 4 of the 19 had two or more fistulae. In some cases there may be a large area of inflammatory tissue with many sinuses and closely resembling tuberculosis of the sacrum. It may not be possible to determine the character of lesion in such cases before operation when a noraml sacrum is found to underlie the mass of inflammatory tissue.

TREATMENT

When one considers the pathology of the condition, which is that of a tube lined by epithelium extending from the surface of the skin into a mass of chronic inflammatory tissue, it is evident that anything in the way of treatment except complete excision will not be effective. After passing a probe into the fistula it should be dissected out down to its termination. Then, by means of

2. Lower power of specimen removed from sacral region of 3.5 month foetus by Mallory.

3. High power transverse section of epithelial lined sinus showing resemblance to skin epithelium and absence of glands.

the finger tip the indurated areas are identified and completely excised. The wounds in the four cases above reported were partially closed with silk worm gut sutures; a drain was inserted between the sutures. Three cases were given ether, one was done with local anesthesia and was followed by more local reaction than was noticed in the other three.

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DISCUSSION

DR. A. A. LAW, Minneapolis: Sacro-coccygeal tumors naturally fall into three definite groups, the simple dermoid cysts, the teratomata, and the mixed tumors so-called. Other tumors, rather general in their distribution, are quite rare in this region.

Dr. Staley's slides show beautifully why the simple dermoids are derived from the ectodermal layer, as they show a pinching off and infolding of the ectoderm in the coalescence of the cutaneous lines. Later in life this pinched off ectodermal anlage may receive some stimulus and start to grow. This explains the development of the simple dermoids, but it does not explain the more complex tumors, like the teratomata and the mixed tumors.

The essayest spoke of the neurenteric canal. Early

in fetal life, this canal communicates with the primitive gut. When the proctoderm invaginates to form a part of the cloacal chamber, it meets the hind gut at a point in front of and some distance above the place where the neurenteric canal has its opening into it; therefore, there remains for a period a part of the gut down behind the anus, called the postanal gut; this later becomes obliterated as does also the neurenteric canal. After maturity is reached, or sometime before, under some unknown stimulus, vestiges remaining from these obsolete canals are responsible for the so-called teratomata, and if the vestiges contain remnants of the ectoderm and mesoderm they explain the so-called mixed tumors.

Dr. Staley's cases reported demonstrate the neccessity of radical operative intervention. It is not enough to simply curette the sinus; we must remove in toto the foetal rest which is responsible for the sinus and dermoid.

There has been an interesting theory advanced to explain the formation of these tumors. I am quoting Thompson who sponsors Adami's observations of the so-called growing points of plants, where a rapid growth is brought about by the division of the daughter cells at the superior and inferior growing points in the root and stalk ; in the mammal they start at the base of the brain and in the sacral region. At the time of development of the nervous system the complete development of the growing points stops for some reason. Through some exciting agent, if the growth continues after the mammal has reached maturity, the cells have the peculiar property of reproducing the three primary germinal layers. Therefore, Adami affirms, this explains the etiology of the teratomata and the mixed tumors which occur in the region of the sacrum and at the base of the skull.

DR. E. Z. WANOUS, Minneapolis: I would like to speak of this problem from a practical standpoint. In my experience I have seen two cases that were operated for ischio-rectal abscess. I think that is probably the most common mistake made in diagnosis. The first case I saw was a man who had been operated on two or three times. The wound would heal, then he would have another abscess, and the condition would give him trouble. In speaking to me about his condition he made his own diagnosis. He stated that on one or two occasions, when the abscess was opened by the doctor, he noticed some hair come out of it. The doctor had made a diagnosis of ischio-rectal abscess and had curetted it without giving the patient relief. We followed the fistula to its source, removed the cause, and the patient had a permanent recovery. Another man had had the abscess opened half a dozen times. He has several fistulae around the rectum, and it looked like the remnants of an ischio-rectal abscess. Fortunately we were able to make a correct diagnosis and to give him relief.

DR. E. M. JONES, St. Paul: The fact that it has been shown that we have 20 per cent recurrences in sacrococcygeal dermoids should lead us to a careful consideration of any condition that arises there. It shows there is something lacking. Some of the pathological conditions arising here are the simple acute suppurative conditions; local or deep fistulas extending up from tuberculosis affecting the soft parts or the bone; chronic infection due to burrowing upwards of fistulous tracts, ulceration, and new growths. We also have congenital tumors that are under discussion now.

The treatment of these conditions is well understood, and the treatment of the congenital tumor is the most difficult. The fact that there are recurrences in many cases after apparently thorough dissection, is because the tumors are often multiple and one or more nests are overlooked. It is important in having infection or any trouble in this locality to determine the nature of the infection, and then treat it thoroughly, particularly these congenital tumors, and when you dissect out the fistulous tracts thoroughly, as pointed out by Dr. Law and Dr. Staley, your results are more likely to be good.

Another point is to be sure you do not overlook any underlying disease.

In a series of 630 cases collected at a New York Hospital, it was found that of rectal cases they had 8 of congenital tumors of the sacrococcygeal region. This shows that it is a comparatively uncommon condition, and I believe, when these cases become infected and come into our hands, in taking the scalpel and opening the tumor or cyst we only afford temporary relief. We do not remove the cause. It is necessary to put these patients under good anesthesia and do a radical operation.

A PLEA FOR BETTER REFRACTION WORK AND FOR MUSCLE TRAINING*

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As one who has lately returned to practice from seven long years of lonely research work, and rather for the sake of further fraternal companionship than of any strenuous and competitive activity, I may perhaps be pardoned if I offer, under the heading of a plea for more careful refraction and for muscle training, not so much instruction as a kind of brotherly adjuration for the better doing of things already known but not so strictly attended to as they ought to be. I hope that no one present will get the idea, from what I am going to say, that I intend any sort or kind of criticism of the work being done at the Head of the Lakes. About that work I know, and can possibly know, almost absolutely nothing. I am going to speak solely of conditions in general, as far as I happen to be familiar with them, which obtain in various

*Read before the St. Louis County Medical Society, Dec. 9, 1920.

portions of the United States. I have refitted glasses (just as everybody else has done) which had first been fitted, or misfitted, in Chicago, Kansas City, Peoria, Ill., and Stuff Center, Arkansas. The finest piece of work I have ever found was done by an optometrist (who had labored three days on the task) in a tiny country town in Southern Illinois, and the worst (a job that almost called for hanging) was performed in a very large city by an eminent and exceedingly able professor of ophthalmology. The professor had been in a hurry, as professors are apt to be. He sadly overcorrected a case of progressive myopia, and got his really symmetrical axes unsymmetrical, besides. As an end result there developed a double detachment of the retina and absolute blindness. Need I offer an apology, Ladies and Gentlemen, for speaking before you on a subject which involves the cure (or the failure to cure) not only of a host of so-called "minor" symptoms—headache, neuralgia, nausea, disturbances of nutrition—with consequent inability on the part of the patient to secure an education or to perform his daily tasks, but which even involves the preservation of the organ of sight itself? More and more, as civilization goes on, people are coming to "live" in their eyes. Now few eyes are optically perfect, and on the refractionist and muscle trainer—whether optometrist or physician—depends the ability of the subject to keep his place in "the great march."

First, I would speak of errors in the fitting of glasses; lastly, of the most neglected field in all the wide curative domain—namely, ocular muscle-training.

As to errors in the fitting of glasses, first of all is that esthetic as well as scientific mistake, the fitting of lenses of enormous diameter and in the so-called "shell" frames. This hideous fad began in 1914, rapidly spreading throughout the nation until, in the course of a couple of years, almost every man, woman and child, had lost all individuality of appearance, presenting, in fact, a countenance wherein the predominant factor was not(as ought to be the case) the eyes, but the spectacles. The American people have, in sober truth (although it seems impossible) presented, in greater part, for a period of about six years, the appearance of massive pairs of spectacles, going up or down street, with, incidentally, human beings behind them. But the esthetic sin is not, by any means, the worst committed by the ordering of such glasses. It is a well known fact that, as a rule, the distance between the centers, of the lenses in a pair of spectacles or eyeglasses, should be exactly the same as that between the centers of the pupils of the eyes. As to glasses worn in reading, the interpupillary distance of the glasses ought, in fact, to be a trifle smaller than the interpupillary distance of the eyes. Now it is practically impossible to prescribe for narrow faces, or wide faces if the eyes sit close together, a pair of 40-44mm. lenses in shell frames without the interpupillary distance of the glasses being greater than the interpupillary distance of the eyes The lenses can, it is true, be decentered in the frames, but much decentering is difficult and costly, in lenses of large diameter, and, in sober fact, the decentering is usually not done. As a consequence millions of people in this country are daily suffering from eyestrain, just for the sake of a fad.

It is said, to be sure, that a 40 mm. lens, round, does not necessitate any wider interpupillary distance than a 40-mm. lens, oval, such as often is used in metal framed, or rimless, spectacles. Very true, but, in the case of narrow faces, the 40 mm. oval should not be prescribed in one kind of frame or another, but, in any case, a lens that is small enough to make the interpupillary distance precisely right. This cannot be done in the shell frames, which, as I am informed by one of the manufacturing opticians in Duluth, do not come in any less diameter than 36 mm. There is another point. You have to add double the thickness of the shell to get the true diameter of the lens, for half the lens-diameter and one frame-thickness stand between lens-center and the patient's nose. Then again, in metal frames, or rimless mountings, the lenses can, if far enough forward, be brought in front of the nose some 2 or 3 mm. at the greatest diameter of the lens, while, when the nose-piece of a shell frame is also of shell, this cannot be accomplished.

There is yet another foul crime to be attributed to lenses of enormous size. It is well known that the customary lens is ground correctly only for a very narrow area in the center of the glass, in fact, just 25 degrees in each direction from its center. As the eye looks through the more peripheral part of the lens, it gets both longitudinal aberration and also astigmatism from oblique incidence. Such fearful disadvantages are, it is true, avoided by the use of a lens of wide aperature, for example, a "Punktal" lens. But such lenses involve additional expense, and, in fact, are not very often

prescribed. Nor is even this the whole of the indictment. The so-called "shell" frames are not shell, but celluloid, and are, in consequence, explosive. You are all familiar, as physicians, with burns and other injuries produced by the explosion of celluloid combs, hair-brushes and collars. Now the explosion of the celluloid eyeglass or spectacle frame is likely to be a much more serious affair, if only for the reason that the explosive material, when the spectacles are in position, is very much nearer to the eyes. One of my neighbors, only about a year ago, while waving out a match with which he had just lighted a cigar, exploded the right-hand frame of his "shell" glasses. They were "shells," sure enough. He was not so badly injured, however, as the most of those who suffer from such explosions. A small amount of celluloid, or "shell," upon the temples, just where these go back of the ears, is comparatively safe, and, being very pleasant and soothing to the ears, is permissible. But, elsewhere, the so-called "shell" (which, let me repeat, is nothing more or less than celluloid) is about the worst possible material that can be employed in the manufacture of spectacle frames unless it be dynamite or t. n. t. Perhaps these substances also will soon be in fashion. Celluloid itself is, in fact, made chiefly from camphor and gun cotton. "Fashion hunts for the worst," is an old proverb.

I do not want to be too reprehensive. Doctors are human beings, and, ordinarily, do simply the best that they can. Some patients will not wear glasses at all unless prescribed these hideous and unscientific affairs. Well then, of course, we prescribe them. I prescribe them almost daily. I cannot help myself. No opthalmologist can, in fact, do otherwise than prescribe them. All I insist upon is that the doctor tell his patient plainly the various disadvantages to which the use of shell frames and 38 to 44 mm. lenses will almost certainly subject him. Then, if the patient shoulders the consequences himself, the doctor is clear of the burden. One cannot take a club and beat sense into a patient. One ought, however, to take time, and reason with him. If no result, the doctor has done his duty. Better the shell frames and correcting lenses, in cases of eyestrain than nothing at all before the eyes.

I am happy to add that "shell" frames and enormous lenses are rapidly going out of date. Recently I spoke to the managers of three of the largest optical houses in Minneapolis. All three informed me that, whereas, a short time since, they were selling 40-44 mm. lenses and "shell" frames almost exclusively, they now are selling three or four pairs of lenses of moderate size in rimless gold mountings to one pair of the former and very hideous kind. In Philadelphia and New York, these gentlemen informed me, the fad is deader than in Minneapolis and St. Paul. Just when the hoped for funeral will occur at the Head of the Lakes I am unable to predict. But let us all, as scientists, and not mere mongers of fashion, do all we possibly can to speed the blessed day.

Another very common mistake in the fitting of spectacles comes from the use of the lens-measure. I have no time to expound in detail the various fallacies of this instrument. Suffice it to repeat the words of the highest authority on ophthalmic prisms and lenses, Charles F. Prentice, M. E., of New York City. Says Prentice: "The so-called lens-measure is indeed practicable only for *concave* lenses, since they alone are of negligible thickness, but, for thick convex lenses, above 7 dioptries, this instrument is absolutely unreliable; nor can it be used on any other lenses than those having a refractive index of 1.5." When you consider that the two chief manufacturing opticians in Duluth employ, the one the Bausch and Lomb, the other the American Optical Co., glass, and that these two glasses have different indices of refraction, you can see in a moment what is involved when the refractologist employs the spherometer, or lens-measure.

Moreover, in neutralization, it should be recalled that concave and convex lenses, being necessarily of different thicknesses, do not accurately neutralize in accordance with their respective curvatures. An equibiconvex lens and an equibiconcave lens, each of a 10 dioptry curvature, on each of its two surfaces, cannot possibly neutralize each other. Just consider. Two such lenses, set in apposition, face to face, optic centers exactly in line with each other, constitute not a piece of plane glass but the central portion of a very large, deeply periscopic, lens, with a net plus effect. In other words, a plus lens which is exactly neutralized by a minus 20, is not a plus 20 lens. It is a plus 19, with a decimal left over that is absolutely negligible. In a word, we may say that a plus 19 and a minus 20 lens neutralize each other exactly.

Yet another mistake arises from confounding degrees with prismdioptries. At first, prisms were

designated by the degrees of their principal angles, regardless of the index of refraction, and, therefore, of the deflection of the image which the prism produced in the field. Later, this was felt to be unscientific, and prisms were then designated according to the deflection produced in the field. This kind of "degree" is about half the value of the other kind. Then the "centrad" was introduced by Dr. W. S. Dennett. Now, the centrad is the hundredth part of a radian, and a radian is an angle whose arc is the same length as its radius i. e., 57 degrees and a little over. The value of a centrad is therefore a little over half that of a degree of deflection. Now, all these kinds of units of measurement are arc values. A prism-dioptry, however, is a tangent value. To make a long story short, a prism-dioptry is approximately half the value of a prism-degree. Look in some trial cases and you will see the prisms marked with figures and a tiny circle after each. That means so many prism-degrees. Look at other trail-cases, and you will see the prisms marked with figures and a tiny triangle after each. That means so many prism dioptries. If the prisms in your trial case are marked with the little triangles, and you, in writing your prescription, call for degrees, you will be making the strength of your prism approximately double what you intend it to be.

Another very common mistake in refraction work, especially in the fitting of patients who have been operated on for cataract, is to set (as is usually done while fitting) the sphere in the backmost cell of the trial-frame and the cylinder in the foremost. Often (especially for the poor) a catrex lens, or a catral, is not prescribed, on account of the expense. Even an ordinary periscopic lens may be too costly. Then, of course, the optician, when he grinds the lens, very properly puts the sphere on the anterior surface and the cylinder (if it is the weaker element, and it nearly always is) on the backmost, thereby securing less aberration than if he did the other way. The patient therefore receives his glasses with the relations of the elements of his lenses simply reversed from what they were when he was being fitted or misfitted. The cylinder has been weakened and the sphere strengthened. Before we write a prescription for such lenses, we should try the cylinder in the backmost cell, and the sphere in the foremost, and remember that that is the relation which these two elements of the lens will maintain to each other when ground upon one single piece of glass.

There is one more exceedingly important, if also very simple matter. Often a patient returns with his convex reading glasses which we have recently prescribed, saying that they "draw" his eyes. We know that we got the strength of the lenses right. We were very careful about that. Yet the patient cannot wear his glasses. What's the trouble? The trouble almost always lies in the fact that the patient's internal recti muscles are too weak, or what amounts to the same thing, the external recti are too strong. A doctor, when fitting glasses, should always test the various muscles. Then, if the internal recti are too weak, he should give the indicated strength of lenses, but have the patient return again and again to have his internal recti strengthened by appropriate, graduated exercises. What, as a rule, does a doctor actually do? He lessens the interpupillary distance, which coddles the internal recti and so begets a further weakness in them, or else he cuts the strength of the convex lenses so that a fraction of the patient's presbyopia is left uncorrected. By either of these methods he induces the patient to wear his glasses without complaint. Such short cuts, however, to good terms with a patient, are generally reprehensible. Nevertheless, they are, sometimes, the absolutely only methods that are open to the doctor. And why? Because the general public has never been educated to the tremendous necessity for the training of the ocular muscles. I have even heard ophthalmologists declare that, the refraction once corrected properly, the equilibrium of the muscles will take care of itself. That, however, is, in general, a gross misstatement. It is true only of pseudo-heterophoria. Men who make the statement are not accustomed to testing their patients' muscles after the glasses have, for a time, been worn. If the patient has received decided benefit, he is very well pleased. Why, then, thinks the doctor, should not he also be satisfied? We, as physicians, should never be content except when the absolute maximum of benefit has been conferred upon our patients.

Of course I am not attempting to mention all, or even all the commoner, mistakes which are made, sometimes necessarily, sometimes unnecessarily in the fitting of glasses. I have given only a few samples.

Now I come to the second and final portion of this paper, namely, muscle training.

I have already stated that the ophthalmologist, or optician, should, when testing eyes, test not only the refraction, but also the tonicity, duction, version, and endurance of all the various muscles which move the eyeballs in, out, up, down, and also which rotate the eyeballs on their antero-posterior axes. Then, when heterophorias exist, that is to say, lack of balance in the strengths of opposing muscles, or even an actual balance which, however, is due to weakness only, then this pitiable condition ought to be corrected. For those who are not ophthalmologists, I would say that the question here is complicated. Whether the triceps muscle of the arm is stronger than the biceps, or the biceps stronger than the triceps, is a matter of little moment if only the muscles are strong. But the tiny muscular ribbons which move the balls of the eyes must not only be strong, they must be also correctly balanced. And not only must the opposing muscles of each single eye be balanced, in order to point and hold that eye correctly and without fatigue, but various pairs of muscles in both the eyes must be ocrrectly balanced, each against each. The problem is further complicated by the fact that some of the extrinsic ocular muscles perform not one, but two and even more, functions. No such delicate problem presents itself in any other part of the body. Let the intricate muscular apparatus of the eye become even a little disturbed in its equilibrium, and there is suffering, or, at the very least, ocular inefficiency.

Now, under these circumstances, a person would think that the ophthalmologist would, when fitting glasses, invariably endeavor to get at the true condition of the ocular muscles. Yet, as a rule, he does not. The time and energy consumed in doing such work, and doing it as it ought to be done, is simply enormous. I remember that, when in practice before, I would wellnigh hate myself, because, with operations waiting, I had not the time to dig down deeply into the muscular troubles of my patients. Sometimes, when busy with ocular surgery, I would even almost hate the refraction patients themselves, because they took so very much time from matters in which, just then, I was feeling a greater interest. Again, I would become more deeply absorbed in refraction and muscle work than in surgery, and then I would almost hate my operative patients because their demands on my time and attention came in as a kind of impertinence upon this highly engrossing occupation. I have talked with other opthalmologists, and many of these, I found, have had similar psychological experiences. Optometrists do, as a rule, confine themselves to the fitting of glasses, but they know nothing of the many diseases of the eye, or of ocular dependence on general diseases, consequently they often fit glasses, or attempt to fit them, when the patient is sadly in need of attention to his kidneys, his pancreas, his hardened arteries, his heart-disease, his bad teeth or tonsils, or perhaps his syphilis. One of the very saddest cases I have ever known, in the course of a long experience, was that of a syphilitic whose family was wholly dependent on him, and who, though suffering from syphilitic neuro-retinitis, was fitted by a jeweller, time and time again, until he became totally and hopelessly blind. Moreover, all the golden hours during which the ravages of his syphilis in other portions of his body might have been arrested, were ignorantly permitted to go by. Later, he died in the hospital for the insane at Anna, Illinois. The wife and mother went to working out, and the sadly neglected children to the dogs. An exceptional case? I would not say so. On the other hand, I have seen, as already mentioned, some cases in which the optometrist's refraction work had very much excelled the work of an M. D. ophthalmologist. The broad training of the physician and close specialization are *both* required.

Muscle testing cannot be done in a hurry. Many times I have seen (once again, I speak not of the Head of the Lakes) an ophthalmologist sit his patient behind a binocular phorometer, and, after a little turning of the lever, and a very few questions decide: "There is nothing the matter with the muscles."

Now, not only is a binocular phorometer a bad instrument, but why did the doctor think he had really tested the eye-muscles, when all he had done was to test those muscles for tonicity? Orthophoria may be sthenic or asthenic. Muscles, in other words, may be balanced in weakness, as well as in strength. No set of eye-muscles has been accurately investigated until not only the tests for tonicity, but also those for duction, for version, and even for endurance (by means of the ergograph) have been most carefully applied.

The greatest trouble is that the medical profession itself, as well as the laity, does not fully appreciate the almost incalculable importance of what is sometimes contemptuously spoken of as "spec fitting." The fitting of spectacles is a field

of almost infinite extent and difficulty. We must educate, first ourselves and afterwards the laity, to demand a higher standard for such work, and, in the case of the laity, to pay for the time and trouble which such a standard necessarily demands.

Such a proceeding as I have briefly outlined, would exact that the refractionist who followed it should fit not more than three, or, possibly, four, pairs of eyes in a single afternoon. Sometimes, in a specially difficult case, he could not fit any more than a single pair of eyes in two, or even three, afternoons. But the work, in case the refractionist understood his business, would then be done with all the thoroughness with which a lawyer would delve into the case of a client whose life he intended to save. It would be done right. It would have to be charged for in accordance with the time and trouble consumed (no use to pretend to the contrary) but it would be done right. Deadbeats and hurry-fools would necessarily exclude themselves from its benefits. Moreover, for the present, we shall have to do merely the best that we can. I have spoken in this paper of ideal conditions. But may we not hope that the time will soon arrive when the more intelligent portion of the public, as well as the medical profession, will not only permit, but even insist, that such highly important work shall be performed in a wholly befitting manner?

THE TREATMENT OF TRACHOMA*

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The incidence of trachoma in the west north central states which include Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas, has not been considered of sufficient importance to arouse general attention. Except in localities where circumstances of employment are accountable for racial or nationalistic aggregations the disease is rarely found in endemic form and even then a rather small percentage of all persons are found to be affected.

On the iron range of Minnesota, among the Indians of the Dakotas, and among the inhabitants of the mountainous regions of Missouri the frequency of the disease may be accounted for by poor working and housing condition and the difficulty of securing proper medical assistance. However in the state of Minnesota blindness is found almost as frequently in the native born as in the foreign born. While definite statistics of trachoma in Minnesota are not available it is significant that while trachoma is given in the census report as the cause of blindness in 1.5 per cent of cases in the United States as a whole it is given as the cause of blindness in 2.9 per cent of the cases in the north central states, which is higher than that for any other group of states, although the actual number of reported cases of blindness from trachoma in this group was less than is some others.* Thirteen per cent of the cases of blindness in the north central states were reported from Minnesota. As blindness occurs in only a small percentage of cases, the total number of cases of trachoma would seem to be rather large; our experience in the Mayo Clinic indicates, however, that trachoma is a relatively infrequent disease. In 1919 forty-nine active cases of trachoma were found in more than 20,000 persons examined.

The problem in the management of trachoma which concerns us most directly is not the prevention of ultimate blindness, for comparatively few persons in this territory who have trachoma become blind. Because of careful inspection of school children and the segregation and treatment of pupils with trachoma the disease has not assumed the proportions of a menace in our schools. The number of persons who have such a mild chronic trachoma that they defer treatment or are content with inadequate treatment, is sufficient, however, to warrant wide investigation from the standpoint of public health because of the final impairment of vision and the economic loss of the afflicted. The cases of trachoma with which we have to deal are mostly mild and only after years of moderate discomfort cause a loss of visual acuity and deprive the sufferer of the comfort and satisfaction of sight in the declining years of life.

The controversy which arose over the differentiation of trachoma and folliculosis in the early part of the last century is as yet unsettled. The workers in the hot beds of trachoma whose observation and experience cover thousands of cases

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*Three thousand five hundred fifty cases of blindness from all causes were reported from the west north central states in 1910 of which the causes of blindness were reported; 102 (2.8 per cent) were definitely ascribed to trachoma. Seven thousand thirty-seven cases of blindness from all causes were reported from the east north central states, which include Ohio, Indiana, Illinois, Michigan and Wisconsin, in 3,990 of which the causes of blindness were reported; 134 (1.9 per cent) were definitely ascribed to trachoma.

treated for years admit the difficulty in many cases of making definite diagnosis. A digest of the literature on trachoma leads to the opinion that undoubted trachoma exists in localities in severe or malignant form and questionable trachoma or folliculosis exists in other communities where the malignant form is rare or unseen.

The two diseases, trachoma and folliculosis, have a common pathologic basis. They involve the adenoid tissue of the conjunctiva, appearing in the upper or the lower fornix or on the tarsal conjunctiva, and are characterized by various changes in the appearance of the conjunctiva, including the formation of small papillary protuberances, granular follicles, and hypertrophy of the conjunctiva. In many respects the appearances of the conjunctivae are identical in the two conditions and cannot be differentiated at the first examination. The attempt to make an immediate diagnosis on the appearance of the everted lids is probably largely the cause of the late revival of the controversy with regard to the handling of trachoma. It seems to be well established that trachoma is a chronic contageous disease that eventually causes destruction of the palpebral conjunctiva, which is replaced by cicatricial tissue; that folliculosis is a chronic inflammatory disease that eventually disappears with or without treatment, but does not of itself cause destruction of the conjunctiva nor its replacement by cicatricial tissue. Trachoma is peculiarly a disease of the conjunctiva, while folliculosis is only a part of the generalized adenopathy. There is no basis for the assumption that the two conditions could not appear simultaneously. Neither disease is confined to age periods, and trachoma may be acquired following a long period of folliculosis, although the widespread destruction of the adenoid tissue of the eye by trachoma would make it improbable that folliculosis should ever appear after the formation of a cicatricial covering of the tarsus.

Chronic conjunctivitis of an indeterminate character may be trachoma or it may be folliculosis, and it may be both. The symptoms of the two diseases are often the same, the appearances of the lids and conjunctivae are sometimes identical, yet the course of the diseases varies and the end results are not the same. Folliculosis can be cured, that is, it may be made to disappear without leaving a trace of its former existence, but trachoma cannot be cured in the same sense, for it always leaves scars in the conjunctiva. By careful treatment, however, its course can be ameliorated, the symptoms made tolerable, and the ultimate changes less deforming and less disastrous. The damage to vision, which is the disastrous sequel to trachoma, is caused by disturbances in the cornea secondary to changes in the tissues of the upper lid. These changes consist of granular or follicular protuberances, irregular folds and thickenings, hypertrophy of the tissue, cicatricial tissue without glandular function necessary to the proper lubrication of the cornea, contraction of the tarsus with its consequent entropion, distichiasis, and probably lesser incidental changes.

The pannus which accompanies acute and severe trachoma is perhaps the greatest factor in producing blindness through corneal complications as it is the most difficult to control. The presence of pannus is pathognomic of trachoma for it is well agreed that folliculosis does not produce pannus. The next factor of importance in the production of blindness is the cicatricial contraction of the conjunctiva, tarsus, and other tissues of the lid which occurs in the third stage of the disease. With these changes apparent there is no question of diagnosis and little disagreement with regard to the proper treatment. The early stage of trachoma most resembles folliculosis. The disease is then limited to the palpebral conjunctiva, the symptoms often are not intolerable and may last for years without causing the person to seek medical assistance. A rather large number of school children are found to have papillary changes on the conjunctiva that resemble those characteristic of trachoma, but may be only folliculosis. Without further examination for adenopathy such as pharyngeal adenoids and enlarged tonsils, and without observation of lids under a course of treatment by astringents one is hardly justified in pronouncing such cases trachoma. Where such cases occur in number in regions where trachoma is known to exist they may be classed as suspicious and isolated until further observation reveals the true nature of the disease, but in communities where trachoma is rare the probabilities of finding a large number of school children with true trachoma are far too slight to justify the radical measures that have been instituted in some instances, or which would be justified in cases of true trachoma. Persons whose diagnosis of trachoma is doubtful should not be operated on if observation of the effects of various methods of local medical treatment is possible.

The local treatment of these doubtful cases of

trachoma should be carefully carried out and its effect observed by a physician who can vary the treatment as indications direct. Folliculosis of course needs no local treatment. At least the disease is self limited and no harm will come to the eye if it is not treated.

Trachoma in the first stage should be treated by daily applications of 2 per cent silver nitrate solution to the affected area, supplemented by simple non-irritating collyria such as boric acid, normal salt solution, or 10 per cent to 20 per cent solution of argyrol. If this treatment is begun early in the course of the disease the second stage with its attendant discomforts can be shortened or aborted. Operation on the conjunctiva during the first stage is not indicated. A radical removal of tissue is followed by deeper cicatrization than follows the use of silver nitrate solution, and, while the course of the disease may be shortened, the likelihood of damage to the cornea in the later stages is increased. If local medical treatment cannot for any reason be carried out operation followed by proper after-treatment is desirable. However, the proper after-treatment is identical with the treatment without operation so occasions for surgical interferences are rare.

"Inasmuch as inflammation is reflexly excited or at least markedly augmented by sensory stimuli, it follows that inflammation will be more or less inhibited by all agents which diminish or prevent sensory stimulation at the seat of inflammation. Further, all agents which prevent the abnormal dilatation and permeability of the vessels, and all which diminish the motility of the leukocytes, will also tend to prevent or lessen inflammatory reaction; and lastly inflammatory processes may be etiotropically combated by removing or rendering harmless the pathogenic agents causing the inflammation.

"Astringents form a more or less firm and impenetrable coating on the surface of wounds of mucous membranes by coagulating the superficial layers of cells, so that the glands and lymph spaces are partially blocked, while the gland cells themselves are altered and their secretions checked so that the parts become dry.

"The astringents also exert some etiotropic actions, as they act on the exciters of inflammation, killing pathogenic microbes, and, what is probably even more important, precipitating or destroying the inflammatory cytolytic ferments and those substances which are formed during every cell necrosis and which have the power of exciting inflammation.

"Silver nitrate when used in high dilutions acts as an astringent so that even in the case of a cauterization the traces of the caustic agent which penetrate into the underlying tissues act there as astringents. Consequently the curative effects of many of these substances depend on such a combination of their caustic and astringent actions."[1]

The action of silver nitrate is due to the formation with the superficial tissue of an insoluble silver albuminate which, being thrown off, carries with it the bacteria entangled in the meshes.

"Salts of mercury form only soft or water soluble products; they produce no astrinegnt effects whatever."[1]

When silver nitrate is used in from 2 per cent to 4 per cent solution its action is confined to the surface of the mucous membrane, since silver combines with protoid and sodium chlorid.

"As the organic silver compounds do not directly combine with proteoid and sodium chlorid compounds such as protargol, a solution of an albuminate of silver argonin, a compound of silver with casein and argenamin, (ethylene diamin silver phosphate), exert a more penetrating action."[1] The action of silver nitrate extends quite deep, since it forms easily soluble double salts of silver albuminate-sodium chlorid in the tissue.

"Silver nitrate acts as astringent, irritant or caustic, according to the strength and duration of its application. The surface first turns white, then gradually gray and black by the reduction to metallic silver and oxid."[2]

The silver nitrate solution should be applied to the conjunctiva of the everted lids by a cotton swab or brush. The simple instillation of the solution into the lower fornix with a dropper is ineffectual if not really harmful. The eye may be previously cocained if the patient so desires, but often the cocain solution causes more disagreeable symptoms than the silver solution. In the application of the silver solution the patient should look down while the physician holds the everted lids firmly to the face and the swab is made to brush lightly or heavily over the diseased surface, and especial care taken to apply it to the border of the tarsus nearest the fornix by lifting the tarsus with the swab. The lids are held open until a white film is seen to form where the silver is applied, the excess then immediately washed off with boric acid solution or salt solution. The lids

should then be replaced and the lower fornix again irrigated thoroughly. The amount of reaction the day following the treatment should be an indication of the efficacy of the treatment. If the treatment has not been too severe the white membrane will have disappeared completely and a soft red velvety surface be exposed. If the membrane has not disappeared or the surface tends to bleed easily the treatment has been too severe and should not be repeated until the membrane has exfoliated and the reaction subsided. It is better to apply the silver solution in the morning so that during the working hours the tears will irrigate and flush out the culdesac. At night the lid margins and skin of the lid should be covered with a nonirritating ointment, such as White's, or boric acid ointment, to prevent excoriation and fissures. This treatment should be kept up with only slight omissions for from two to three years.

If treatment of the diseases is not begun in the first stage or if for some reason the disease has not been arrested successfully we are confronted with a more serious problem. Pannus, ulcers of the cornea, and secondary infection are added to the structural and functional changes of the first stage and require strict attention. However, the same treatment should be applied, but the mechanical removal of large granules by expression or scarification may in certain instances be beneficial. Operation should not be radical, except in the most extreme cases. The lightest touch with sand paper or gauze dipped in 1:500 bichlorid solution sufficient to scarify but not destroy the tissue is all that is justified by results. This operation should be considered a hastening step in the treatment of the disease, not a substitute for the medical treatment. Corneal complications are admittedly stubborn in the second stage of trachoma because they tend to recur frequently but yield to treatment. The application of silver solution to the conjunctiva may be all that is necessary, combating secondary infection and the toxic effect of decomposing granulations. Usually it is better not to apply a dressing to the eye as it interferes with drainage of the secretion. Boric acid powder with iodoform powder in equal parts dusted onto the cornea gives excellent results. It may be applied within a few minutes after the application of the silver solution to the conjunctiva. Cauterization of corneal ulcers is seldom necessary unless active secondary infection has been implanted.

During practically the entire first and second stages trachoma can be treated satisfactorily by the use of silver nitrate solution alone. A 2 per cent solution can be used as an astringent or as a cauterizing agent by varying the amount applied and the length of time elapsing before the neutralization with sodium chlorid or the washing with boric acid solution. When the disease is well under control and the symptoms have disappeared the silver solution may be discontinued profitably for a few weeks or a few months and a solution of zinc sulphate of from one to two grains to the ounce given for frequent instillation. A satisfactory method to follow is to stop the use of silver and substitute the zinc solution for one month in three. The zinc solution and ointment for the lids can be used by the patient at home with perfect safety.

Comparatively few patients in the north central states who have trachoma are situated so that they can not have frequent consultation and treatment. However they must be urged to pay strict attention to the treatment and instructed to report for observation at regular intervals. The blindness which follows trachoma is often preventable and every physician should make it his duty to help lower the percentage of blindness from trachoma in the west north central states. Patients seldom realize the danger and must be urged to persist in treatment even after their symptoms have abated and they believe themselves to be cured. The treatment commonly carried out is too desultory. The response to treatment is in proportion to the skill of the physician and no better piece of handiwork could come from his efforts then to handle a case of trachoma so that the misery of its sequelae are made as slight as possible.

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PROBLEMS OF THE FALLOPIAN TUBE INFECTION PERIOD*

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A pathological condition in the pelvis at a period of reproductive activity in women, is always a serious problem. Infections which reach the fallopian tubes by way of the vagina, or through the circulation are likely to produce ultimately a pyosalpingitis with a probable general pelvic peritonitis, together with many intestinal adhesions and a fixation of the uterus. There are many natural provisions against ascending infections. Several barriers have been provided to prevent bacteria from invading the peritoneal cavity through the natural channels. The vaginal secretions, the cervical opening, the sterile uterine cavity, the minute openings into the tubes, all protect against such infections. Even the ciliated columnar epithelial endosalpinx will at times temporarily arrest an invading infection.

The seriousness of an infection is much more readily understood if we recognize the cone shape structure of the tubes, for fallopian cone more nearly describes it, structurally, than fallopian tube. When the uterine ostium is once invaded, the infection passes freely to the fimbriated end where, through agglutination, nature generally makes her last effort to guard against a peritoneal invasion. The multiple nodular enlargements of the tubes, sometimes seen in abdomens that are opened, are but temporary blockings, caused by ciliatel columnar epithelium. They make up the so-called latent cases that are sometimes lighted up during the congestion of menstruation, after curettement, or following a pregnancy.

It is essential to protect the endometrium of the uterus from the constant outpouring of pus through the uterine opening of an infected tube, in order that the function of menstruation may be safeguarded in young women. It is likewise necessary to conserve the ovary for its function of reproduction and for its internal secretions which enter so largely into the chemistry of the endocrine system. Infections which invade the tubes, in the majority of cases, are of gonorrheal origin and affect both tubes. While conservation of the reproductive function must always be guarded, infections which have extended to the fimbriated extremities and have sealed them, have invariably produced an obliteration of the lumen and have destroyed its patency. It then becomes the duty of the surgeon to remove the functionless bridge, that the uterus and the ovaries may be guarded against further invasion. When the tubes are removed, particular care is required to avoid disturbance of the ovarian circulation. This can best be accomplished by first severing the tube at the uterine cornu and then cutting it loose, keeping close beneath the tube, until the detachment is complete. In this way, only small vessels are divided and hemorrhage is slight.

In the recently developed non-operative determination of the patency of the fallopian tubes, by means of the intra-uterine inflation with oxygen, Ruben has devised a very simple method. It is applicable in a limited number of cases that have passed through a pelvic infection of gonorrheal origin. The method is not to be used in the presence of any acute or subacute pelvic infection, nor in the presence of purulent Bartholinian glands, urethra, vagina, or cervix.

CONSERVATION OF FALLOPIAN TUBES.

It is apparent that conservative operation on the tubes has a very narrow field. Infections, other then gonorrheal, generally involve but one tube and it becomes our duty to conserve the remaining tube, even at the risk that it may sometime give trouble, in order that the function of reproduction may be preserved in these cases. Tubal inflammation occluding the distal end without being active, is the most frequent lesion calling for conservative treatment. The diseased portion of the tube may be removed. Kelly calls our attention to the possibility of cleansing a tube with some mild antiseptic, before returning it. The extra tubal inflammatory processes where the occlusion is produced from pelvic adhesions, pressure from tumors, and other inflaminatory masses obstructing the lumen, are pathological conditions calling for conservative operative interference. Tubes damaged through gonorrheal inflammation producing a chronic pyosalpinx, offer little hope of conservative reparation. In mild cases, the inflammatory condition may pass off without destroying the lumen of the tube, and it is because of these cases, that many men are treating all cases expectantly. The majority of these infected women complain of severe pain in both illiac regions, there is considerable local reaction, the tubes are edematous and upon examination are

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found to be painful, enlarged, and tipped back toward the pelvic floor. The reactionary inflammation causes the tubes to become adherent to the adjacent organs. As the inflammatory process continues, the dense adhesions involve the ovaries, producing a disturbance of their circulation, which frequently results in cystic degeneration and destroys their second greatest function in young womanhood, the function of internal secretion.

COMPLICATIONS ARISING FROM DELAY.

We all have seen cases where the sypmtoms have abated and all evidence of infection has disappeared. It is likely that the discussion will bring out the citing of instances where women have given birth to children following gonorrheal salpingitis. These cases, however, are of the mild type, or probably unilateral infections. When suppuration persists, the formation of pus is a distinct indication for removal of the tube. Unless drained through vaginal puncture, it may rupture and evacuate itself through the rectum, the vagina, the bladder, the abdominal wall, or it may discharge into the peritoneal cavity. These fistulous tracts are sufficient sometimes to drain the abscess and give relief from pain. The relief is usually temporary and the patient may succumb to repeated infection, or the residue may become a pathological entity, which requires surgical interference. Many of these cases continue to discharge pus intermittently for years, each attack being characterized by pain, fever, and fresh inflammation, and the woman goes about in a state of semi-invalidism.

Clinical experience shows pelvic suppuration to be almost always in the tubes. In other than gonorrheal inflammation, the infection spreads by way of the lymph channels or the blood vessels in the cellular tissue of the broad ligaments. These vessels may transmit the infection to the tubes and overies, or the course of infection may be arrested by thrombic plugging of the vessels and result in a pelvic cellulitis. If the ovaries are to escape degenerative changes, and their function is to be maintained, their circulation must be guarded before their blood supply is destroyed. The frequency of cystic degeneration of ovaries after hysterectomy, is sufficient proof that the condition is brought about through disturbance of the circulation. The ovaries are of paramount importance for the general welfare of our patients.

SURGICAL TREATMENT.

Acute adnexal inflammatory conditions should always be treated expectantly. We have learned that time alone sterilizes the tubal inflammation, and nature aids us to a considerable degree in making surgical intervention a comparatively safe procedure. In most cases, sterilization will take place within three months. No radical operation should be done during acute tubal infections, nor acute exacerbation of chronic inflammatory conditions. A leukocyte count will often help determine the activity of the infection, a high leukocyte count revealing a virulent pathological condition with which it is dangerous to interfere. Cases of active infection will frequently manifest a rising temperature following a vaginal examination. It is expedient to do a vaginal puncture to evacuate the pus, if it is found upon examination to be localized. Some of these caese will be relieved without further operation. Delayed cases which suffer from repeated attacks are often secondarily infected from the intestinal tract, and produce pathological conditions which make them very serious surgical cases.

When the disease has progressed to permanent obstruction of the tubes and has destroyed their patency, the tubes are of no further functional value. It is, therefore, conservative surgery to remove them, that the ovaries may be protected against cystic degeneration.

CONCLUSIONS.

1. It is of the utmost importance to conserve the ovarian function in young women who suffer from pelvic infection.

2. It is necessary to remove the pathologic tubes before their inflammatory product destroys the ovarian circulation.

3. Delayed operative procedures often make it a very formidable operation because of the extensive complications that intervene.

4. Many patients become invalids because nature has not been able to check the destructive process of an invading infection.

A CASE OF PULMONARY INFECTION WITH A NEW SPECIES OF ACID-FAST ACTINOMYCES*

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The acid-fast actinomycetes are not common and therefore not as well known as other pathogenic varieties. They are, however, of great interest from the standpoint of bacteriology, since they furnish the closest contact between the true bacteria and higher fungi, being closely related to the tubercle bacillus in morphological and cultural characters, pathogenicity and serum reactions; and, second, from the standpoint of clinical medicine, since they produce infections which bear a great resemblance to tuberculosis, with which they may be confused, the confusion extending even to the microscopic examination of the sputum.

These infections differ from tuberculosis, however, in having a distinctly more unfavorable prognosis, the organisms being more virulent both for man and laboratory animals.

The case which we have to report is of interest because the condition was diagnosed during life; the organism was isolated in pure culture from the sputum and proved to be different from any of the recorded species; immunological studies were made and vacine treatment was tried.

The patient is a woman of nervous type, 31 years old, married, with two children. She complains of cough, periodic expectoration on lying down, and general weakness. About three years ago, following childbirth, she took cold and began to cough. She has never been well since, having frequent attacks of tonsillitis and a chronic cough. At first there was very little sputum; what little there was "appeared greenish and shiny, with a peculiar medicated odor." But about two years ago she began coughing up large quanities of sputum, a cupful or more during the day. The sputum was occasionally blood streaked. She gradually developed a goiter for which an operation was performed one year ago. Three months later she began to cough more and had severe pain in the right chest. There was fever for several days at this time and for several months there was a degree of fever every day or so.

The patient was first seen July 18, 1919. Physical examination at this time revealed nothing noteworthy save an area of impaired resonance with crackling rales in the right axilliary region from the fifth to the eighth ribs. Roentgren screen examination showed slight thickening of both apices and small annular shadows near the hilum of the right lung. There were no areas that suggested massive consolidation or large accumulations of pus.

The laboratory findings were negative save for the sputum, to be described later. The temperature showed no abnormal variations during two weeks.

Intracutaneous tuberculin tests were positive both with Koch's O. T. and tuberculin prepared from tubercle bacilli treated with CO_2 under high pressure, according to the method of Larson, producing areas of infiltration the size of a half-dollar in forty-eight hours.

The sputum was examined for the presence of tubercle bacilli by the Ziehl-Neelson method. The examination revealed the presence of acid-fast branching filaments. For the most part these were isolated strands showing lateral branches at irregular intervals, but occasionally there was found a considerable mass of mycelium in which the central filaments were closely intertwined, the peripheral portions being irregularly arranged in a radial fashion, resembling somewhat the sulphur granules of ordinary actinomycosis. For the most part the filaments were quite uniform in diameter, although occasional fusiform swellings occurred; but definite clubbed extremities were never found. In addition to these structures there were many mycelial fragments of varying length, some showing a remarkable resemblance to true tubercle bacilli. The mycelium was not uniform in its acid-fastness, some strands taking the blue counterstain. Moreover, it was not so acid-fast as tubercle bacilli; for, if the 5 per cent hydrochloric acid-alcohol used as a decolorizing agent was allowed to act for a minute or more, practically all of the mycelium was decolorized. Several specimens were examined during the course of two weeks, and all showed the presence of this organism, although in some specimens they were much more numerous than others. There were numerous bacteria of various kinds in the sputum, and all attempts to isolate the organism by plating directly from the sputum were unsucecssful, all

*Abridgement o f paper presented before the Minnesota State Medical Association, St. Paul, October, 1920.

the plates being overgrown by spreading colonies of bacteria.

Two guinea pigs were inoculated intraperitoneally with sputum. These died after five and six days. Autopsy revealed small tubercle-like nodules scattered over the peritoneal surface, being most numerous on the under surface of the diaphragm and the surface of the liver and spleen. The omentum was shrunken to a thick mass in the upper abdomen, studded with nodules. A few flakes of fibrin were present on the peritoneal surfaces, and the parietal peritoneum in addition showed hemorrhages.

From the peritoneal tubercles removed aseptically and crushed, the organism was readily grown in pure culture.

In its cultural characters this organism resembles closely the organism of "ordinary" actinomycosis, producing a snow white, adherent growth on agar, a pellicle on broth and milk; gelatine is slowly liquefied and the casein in milk is peptonized. Media containing peptone or meat extract are turned a dark brown, a feature exhibited by many other actinomycetes.

Our strain is highly virulent for laboratory animals, rabbits dying in 48 hours after intravenous inoculation, and guinea-pigs about five days after intra-peritoneal injection. The virulence has remained quite constant after months of cultivation.

Having obtained a pure culture we prepared an antigen for immunologic studies. The organism was grown in flasks on broth containing 3 per cent each of dextrose and glycerine, until the pellicle broke, about 10 days. It was then heated to 60 degrees C. for one hour, and placed in Dr. Larson's apparatus under the pressure of a fresh tank of carbon dioxide over night. On releasing the pressure it was found that the masses of mycelium had disintegrated, forming a uniform suspension of mycelial fragments. The organism, however, still grew on subculturing, so the suspension was again heated to 65 degrees C. for an hour, and 0.25 per cent tricresol added. It was then found to be sterile.

Part of this material was used in this condition, while another portion was passed through a porcelain bougie, and the clear filtrate was used.

Skin tests were made with both of these antigens, injecting 0.1 cc of a 1-1000 dilution intracutaneously. That night the patient had a chill the temperature rose to 102 degrees, and she ached all over. The next day the temperature was normal. In spite of this severe constitutional reaction there was no visible reaction at the point of inoculation after 48 hours.

The antigen prepared as above proved nonhemolytic and not anticomplimentary, and was therefore used for complement fixation tests with the patient's serum. The reaction was found strongly positive, the complement being completely bound using two drops of the patient's serum and two drops of the antigen, and the antisheep hemolytic system ordinarily used in our Wassermann tests. A similar test made with this antigen and the serums of twelve other persons gave negative results throughout.

As the mycelial fragments, after treatment with CO_2 under pressure, remained in suspension for some time, the antigen was also useful for agglutination tests. The tests were made by the macroscopic method, incubating at 55 degrees C. for an hour, and read after standing in the icebox over night. The patient's serum agglutinated completely in a 1-20 dilution, and partially at 1-100; a control serum produced no agglutination.

The antigen prepared as described above was used for vaccine treatment, beginning one week after intracutaneous injections. The vaccine was injected subcutaneously, given at intervals of 4 or 5 days. The first three doses were 0.1 cc, 0.5 cc, and 0.5 cc of the 1-1000 dilution; the fourth and fifth doses were 0.1 cc and 0.5 cc of the 1-1000 dilution, and the sixth dose was 0.1 cc of the 1-10 dilution. After the third dose there was a very slight febrile reaction and a small lump at the point of injection; otherwise, there was no reaction to the injections of vaccine.

After the last injection she returned to her home in another state. Her physician there was furnished with a supply of a vaccine, and the injections were continued for another month. After each injection there developed a very painful lump and the vaccine was discontinued for this reason; no constitutional reactions. The dosage was not further increased.

Letters received from the patient in January and October of this year indicate that the disease has progressed somewhat; the cough and expectoration continue, and on three occasions there have been hemorrhages from the lungs. Following these hemorrhages there has been fever, but at other times her temperature has been normal. She gained weight for a while and then lost twelve

pounds, but has been gaining weight lately. She has complained much of pain in the chest.

Aside from the injections of vaccine, the patient was placed on the usual tuberculosis regime, but otherwise no treatment was given. On returning to her home she again resumed her usual household work.

The organism which we have isolated resembles closely the acid-fast actinomycetes described by Eppinger, Aoyama and Miyamoto, Birt and Leishman, and others, but differs from those strains hitherto reported in its proteolytic activities as evidenced by the digestion of gelatine and casein. Because of the chalky-white appearance of the growth on media, we propose for our new species the name *actinomyces gypsoides.*

THE VALUE OF CONSERVATIVE INTRANASAL DRAINAGE FOR CHRONIC EMPYEMA OF THE ANTRUM.

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The study of 100 cases of chronic empyema of the antrum furnished interesting data with regard to the value of the Krause antrum operation, or window resection. In all the cases studied the infection of the ethmoid or frontal sinuses, which may have existed previously, had cleared up and was not a factor in the infection at the time of the antrum drainage, in other words, the antrum infection was residual, the sinus acting as a reservoir.

In the routine examination of these sinuses it was found that diagnostic puncture is the only reliable means of diagnosis. The x-ray was a valuable aid but not always reliable; the same may be said of transillumination. Many of these patients did not have symptoms referable directly to the antrum, and statements with reference to the possible duration were inaccurate.

TECHNIC

The diagnostic opening was enlarged under the inferior turbinate well toward the floor of the nose. In very few cases was it necessary to sacrifice turbinate tissue.

The after-treatment for the most part consisted of repeated irrigation and suction and simple air-drying. No one particular irrigant was found to be of greater value than another; a mild alkaline solution seemed to be accepted kindly by the tissue. In the air-drying process the canula is inserted into the antrum and the membranous lining is dried with compressed air without irrigation. This seems to be a valuable procedure in many cases. In some cases in which the condition persisted after irrigation, improvement immediately followed the dry treatment. It would appear that the drying of the sinus discourages further formation of pus. In this connection the word "cured" means that the discharge has cleared up and local symptoms, if any, have subsided. In all probability a chronic sinusitis is never cured permanently; it is a well accepted axiom that once a sinus case, always a sinus case, in other words, the sinus once involved is always liable to flare up with repeated colds or any condition accompanied by a lowered resistance.

Of the 100 cases reviewed 47 per cent were cured, in the average case in thirty-two days. Seventeen percent were not improved; 6 per cent were finally operated on radically, either the Caldwell-Lue or Denker operation being performed. Thirty-six per cent were improved, but not cured.

Further analysis demonstrated the fact that in the cases in which the condition did not clear up readily an opening sufficiently large had not been made at the first operation. If the condition did not respond to such treatment it was usually found that definite pathologic changes in the membranous lining, polypoid degeneration, hyperplasia, and so forth, had taken place. A few of the patients who were improved but not cured might have made further progress had they remained longer under treatment. Their condition, however, is reported at the time of their dismissal.

CONCLUSIONS

1. The analysis of these cases demonstrates that intranasal drainage in chronic empyema of the antrum is a safe and efficient procedure in 47 percent of cases.

2. If adequate drainage and ventilation does not give satisfactory results in from three to four weeks more radical methods should be adopted.

3. Cases in which the membranous lining has undergone hyperplasia or polypoid degeneration will usually need more radical treatment.

4. Dry treatment, or air-drying, seems to be as efficacious as irrigation in many cases.

TRAUMATIC INJURIES OF THE SPINAL CORD AND ROOTS*

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When the spinal cord is completely destroyed at any level there develops a certain well known syndrome. This consists in the loss of all reflexes below the level of the lesion, lack of voluntary control of the bladder and rectum, absence of all varieties of sensation from nerves having origin below the injured segment, and total flaccid paralysis of muscles receiving nerve supply from below the corresponding segment. Further than this, there is a general belief, well supported by facts, that the cord when once destroyed never regenerates. These two statements have interjected much pessimism in the discussion of spinal cord injuries. This tendency has resulted in neglect of this class of cases to so great a degree that a paper seems justified, the purpose of which is to demonstrate that all patients presenting such a syndrome are not hopeless.

Most spinal cord injuries either die or suffer great disability on account of urinary infection or infection from decubitus ulcers. In a few rare cases the spinal lesion has even disappeared and the patient has recovered from the paralysis of the limbs, and yet there was disability on account of neglect of one of these factors. Therefore, more attention should be given to the prevention of these complications in any case whether we think recovery is possible or not. Both ulcers and urinary infection can be prevented. The use of the soft rubber catheter sooner or later results in disaster. When it is possible to empty the paralyzed bladder by massage or by waiting, it is best to do so. If catheterization is necessary, a highly polished silk catheter is less apt to do harm than a rubber catheter. In every case in our experience where the rubber catheter had been used there was infection. Continued use of the catheter usually resulted in increased infection and ultimate death. On the other hand, we have had cases that had never been catheterized where the bladder did not rupture because of this, and in course of time these patients developed a clean automatic bladder. Even if infection has developed, massage, internal administration of acid sodium phosphate and urotropin often clean up this complication. When no improvement occurred with this medication, the use of salol and sodium bicarbonate was sometimes efficacious. Decubitis ulcers are due to trauma and infection in areas deprived of sensation. The patient having no sensation can not protect himself as a normal individual would; therefore, pressure or other trauma must be prevented by the attendant. Moisture of any kind predisposes to infection and ulcers; hence, keep the patient dry and clean; use oil on the skin. Denervated tissues do not ulcerate spontaneously, and aniaml experiments show that denervated tissue of almost any kind heal if protected from injury. The fact that we can not tell whether the syndrome of a complete lesion means permanent or temporary impairment of cord function emphasizes the necessity of the utmost general care in every case.

Injuries to the spinal cord may have a variety of resulting pathology, some destined to undergo spontaneous recovery, others requiring surgical assistance, and others destined to remain stationary. According to Frazier we may have any one of the following:

1. *Hematorrhachis,* that is, hemorrhage within the spinal canal, and either intradural or extradural.
2. *Hematomyelia,* or hemorrhage diffused, often in discreet areas into the substance of the cord.
3. *Contusion,* in the sense used by Allen. Allen defines contusion as the result of the impact without immediate physical solution of continuity, usually progressive and consisting of actual destruction at the time of impact, to which is added the secondary change due to the outpouring of serum and blood into the substance of the cord.
4. *Laceration* of the cord, either complete or partial. And I am inclined to add to these a fifth.
5. *Pure mechanical compression.*

While each of these types tend to bring about a syndrome of symptoms somewhat peculiar, yet the overshading syndrome in all or any may be that of complete transverse lesion. For example, in case of hematorrhachis early neurological examination may show progressive development of symptoms beginning with root-like symptoms, or even meningismus; yet usually before these cases come under trained observation the stage of general compression has developed. Careful examination may develop a syringomyelic type of disassociation of sensation, or even in hematomyelia and

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later the case may show the picture of a transverse lesion.

Contusion usually leads to progressive changes, but unfortunately, at the end of six hours these lesions are complete, and often then we are dealing with a true transverse lesion. Laceration of the cord leads to degeneration of the ascending tracts above the lesion and degeneration of the descending tracts below the lesion. These can be demonstrated histologically at the end of six months. Laceration of the cord is always accompanied by the condition known as "spinal shock". If the lesion is complete, spinal shock in man lasts forever. If the lesion is incomplete, then the spinal shock will pass away. When the spinal shock is gone, then the flaccid paralysis is replaced by the spastic paralysis. In animals, even with a complete lesion and so-called shock, this passes off and the animals are capable of walking reflexly. Compression of the cord may give a syndrome identical with that of a transverse lesion and yet recovery may take place when the pressure is relieved. Trauma, with its widely differing pathology of impact and its secondary sequences, may give a correct or misleading picture of complete transverse lesion. In addition trauma primarily affecting the spinal root, acompanied by contusion of the cord, may give us a deceptive picture of a transverse lesion. Injuries of the nerve roots, even of a severe character, are prone to undergo recovery. In cases of concussion or edema of nerve roots, recovery is to be expected, but spontaneous recovery tends to take place in complete laceration of the roots. The tendency of the roots to repair themselves is shown by the following case:

An avulsion of all the roots of the brachial plexus resulted in complete paralysis of the patient's arm. Return of function in one group of muscles occurred after sufficient time had elapsed to permit of the down growth of the neuraxes. This man was accidentally killed after two years and at autopsy fibres from the avulsed roots had found their way into the ulnar nerve, and it was in the muscle of this nerve supply that recovery had ocurred.

The following case also shows how root lesions will recover and how they may simulate a transverse lesion:

A patient, name N. N., has been crushed under a stone weighing twenty tons. When released he was paralyzed from the waist down. The bladder and rectum were involved, together with complete loss of all varieties of sensation. There was a compound fracture of the transverse and spinous processes of the first, second, third and fourth lumbar vertebrae. Infection complicated the picture. The patient was brought to Minneapolis in this condition, and we attempted to clean up the infection. After this had been accomplished, operation was done to explore the wound. At exploration no damage to the cord itself could be demonstrated. However, the cauda equina was partially, if not completely, severed, or rather pulpified by the numerous pieces of bone. The wound was finally mechanically cleaned, but no attempt was made at suture of even such trunks as were known to be severed. On account of the extensive laminectomy, a plaster cast was applied. The paralysis persisted, but the bladder and rectum soon came under voluntary control. During convalescence the atrophy of the legs became extreme in spite of massage and care, and for several days death seemed imminent from embarrassment of respiration. Treatment was persisted in, and at the end of two years voluntary motion had returned to every muscle except the adductor magnus of the right leg. In one year he was able to perform heavy labor in fact was occupied in driving spikes for the railroad with a ten pound sledge.

A rather rare example of a bilateral root lesion unassociated with any pathology of the cord is encountered in the following case:

J. S. was struck on the back of the neck by a falling tree. Paralysis of both arms gradually developed and finally became complete. No operation was done. This patient has made a partial recovery, in that he can voluntarily move all of his muscles, but all of them seem very weak, and there is a great deal of persisting atrophy that we have not been able to combat.

An almost exact converse of this is illustrated by another case, Case 4.

This man was shot at about the same level as the last case with an automatic pistol. He was for a time completely paralyzed. This paralysis must have been due to some temporary pathology, because he made a complete spontaneous recovery except in those muscles supplied by the sixth and seventh cervical roots. Exploration had shown that these roots were almost completely destroyed.

I again want to repeat that the severed root regenerates as does the peripheral nerve. If the sheaths of Schwan take a predominating part in the role of nerve regeneration and as the cord does not contain any cells of Schwan, it is to be expected that laceration of the cord would never repair; ever since the days of Trendelenburg we have had to agree to this latter statement, that such repair does not occur.

Frazier collected seven cases where the cord had been sutured, and says there have been undoubted cases in which the spinal cord has been completely

severed and subsequently sutured with the preservation of life on the part of the patient; but that the junction of the severed ends is never more than scar tissue is quite beyond question.*

There seems to be at least two reasons why the cord cannot be sutured. First, it is impossible to bring nerve fibres in contact as all sutures show a wide zone of scar tissue. Second, the sheath of Schwan is absent in the cord, and there is almost convincing evidence that these are necessary for regeneration in presence of scar tissue. In section of the cord we are still dealing with an upper motor neurone lesion. That is, the fibres have intact ganglion cells in the cord connected to muscle end plates. Motion is preserved but is of a reflex character and out of control of higher centers. Yet animals with complete cord lesions may be said to walk reflexly. So in animals this reflex motion is of a different character than in man. In attempting to suture the cord the author united the anterior roots above and below a hemisection of the cord in ten dogs. The animals all for a time presented a paraplegia from which they soon recovered with more or less residual paralysis on the operated side. One of the animals made a seemingly perfect recovery at the end of seven months. At the end of this time the dog was chloroformed and the cord removed. It was so deformed by scar tissue that grossly the root anastomosis could not be found. However, cross sections above and below the hemisection were almost identical with the silver stain. Practically the motor tract had the same appearance on both sides. Longitudinal section through the cleft of the hemisection showed proliferating nerve fibres. It is to be expected that in seven months degeneration would be so far advanced that error from that source could be eliminated. It is with some hesitation that I report a single successful experiment, but it is with the hope that this may stimulate some one else to carry the test to the ultimate. I have several times considered the experiment in the human, but the cases I cleaned up for operation began to show enough spontaneous improvement so as not to justify the procedure.

Compression is difficult to separate from contusion. In tumors we have a pure example of compression without the traumatic element. In fractures and dislocations there is always added some degree of contusion. However, as time goes on, in some cases the contusion disappears but the patient manifests the symptoms of a transverse lesion. A typical example of this was shown in a laminectomy where after removing a depressed spinous process infringing on the cord, recovery took place. To show how much compression of the cord may permit of recovery I will interject a case of spinal tumor. The tumor was a capsulated myeloma originating in the vertebra. Careful measurements were made at the time of operation. Before operation the patient had a typical syndrome of a transverse lesion. Three weeks after operation motion began to manifest itself. Six months afterwards the patient made a perfect recovery.

One case of a fracture dislocation of the third and fourth lumbar vertebra prevented symptoms of a transverse lesion. Reduction of dislocation was immediately done, and the patient subsequently secured the use of bladder and rectum, and at the present time can walk but has persisting double toe drop. That is, there is still complete paralysis of the sciatic roots on both sides. Sensation has not fully returned to the feet.

This brings us to the question of operation. It is important to remember that in every operation we do some damage. I have never made an exploration either in man or in animals that I did not leave behind me a legacy of scar tissue. Extreme delicacy in handling and an exact hemostasis have not entirely abolished this. Observation of the work of others leads me to believe that this is not entirely a personal equation. I feel then it is only justifiable to operate when the pathology we correct far outweighs the pathology we produce. On the other hand, the cord, it not itself traumatized, resists wonderfully well encroachment of surrounding scar tissue. I have removed cords from animals previously operated upon that were badly deformed with extraneous scar tissue, yet sections of these cords showed no actual destruction of nerve elements and this was confirmed by functional tests and physiological stimulation.

Taking up each class by itself let us see how

*Myelorrhaphy: Ests, 1889; no motor return or bladder; died.
Briggs, 1898; function of muscles and bladder gradually returned.
Stillwell & Harte, 1902; partial bladder; patient walked.
Fowler, 1905; no improvement.
Shirres, 1905; early autopsy.
Solieri, 1908; autopsy; no nerve fibres regenerated.
Fontain, 1909; recovery of bladder.

far exploration is justified and when interference should be attempted. In hemorrhage we can remove blood clots and effect hemostasis, and by decompression allow escape of uncontrollable hemorrhage. In contusion of the cord Allen has made a remarkable contribution. He has shown that in contusion there is added to the original impact a secondary process in the escape of blood. That is, in six hours this may reach such proportion as to destroy the nerve fibres. Longitudinal median incision in the cord if done very early will arrest the secondary change by allowing escape of blood. Here the balance then is on the side of operation, but, unfortunately, I have never gotten a case early enough to permit of this, but it does not contraindicate operation.

Diffuse hemorrhage into the cord is not benefitted by operation, according to Frazier. Our own experience certainly justifies the removal of foreign bodies producing compression. However, the time for this is not so clear. Added experience may permit some one to definitely formulate rules for a time for operation. So far, there has been very little mortality in our explorations. Two deaths have occurred in connection with cervical injuries when our patient suddenly died from liberating high intradural pressure. In this connection I am unfortunate in having ten deaths from crushing of the spine before we could bring the patient to operation. This gives a total immediate mortality of 12 out of 106 cases, and a subsequent mortality of 5 additional unoperated cases. In the late operative procedures there have as yet occurred no deaths.

DISCUSSION

DR. A. S. HAMILTON, Minneapolis: Dr. Corbett has been working on experimental nerve surgery for a number of years and this with his recent clinical experiences in the army entitles him to speak with authority on the important subject which he has just brought before us. We are faced with very unfortunate results in this form of surgery, and the unhappy experiences in a great many cases of severe injury to the cord have led to efforts to bring about a better treatment. It seems to me however that, in spite of the work done, the situation is about what it was a number of years ago. One must often give a positive opinion as to what should be done in a case of apparent severe injury to the cord and advice is very difficult. Of course, we all agree that if we have a badly crushed cord, operation is useless, but how is one to know that the cord is crushed? It has been stated that where there is complete loss of motion, of sensation and of the deep reflexes, we are dealing with a complete crush of the cord, but so many patients have gotten well, even after presenting such symptoms that the point is hardly worth discussing and we may dismiss it with the statement that it is absolutely impossible by any known neurological methods to determine absolutely as between a functional and an anatomical discontinuity of the cord.

In cases with total crushing of the cord, there is no possible hope unless the cord regenerates. Ballance has insisted so strongly on the idea that no regeneration can occur in nerve fibers unless the nuclei of the neurilemma can proliferate, that we have come to accept it but it is a matter of opinion, difficult of absolute proof, and it may not be true. If it is true, we may as well accept at once the hopelessness of the situation in any complete cord crush because there is practically no neurilemma in the cord, nothing but a slight thickening which extends a short distance into the cord along some of the sensory fibers. But there is, as a matter of fact, some evidence that fibers do regenerate within the cord. A number of cases have been reported of tumors of the cord in which there has been found satisfactory histological evidence of new fibers being formed. If that be true, there may be some hope in these traumatic cases, otherwise there is none. But, be one's theoretical attitude what it may, Cole and Knapp have pointed out that in most of the surgery done, where any attempt has been made to bring the ends of the cord together and to restore function, the results have been bad. Dr. Corbett has reported a few cases where good results have been obtained, and among clinical cases that of Stewart and Harte, which I happen to have seen, is notable. The girl in this case, was shot in a quarrel with a gentleman friend and the bullet passed through her spine. She was operated upon and Dr. Stewart and other observers believed that the cord was totally severed. With great difficulty he brought the ends of the cord together. The girl was absolutely paralyzed for motion and sensation and had lost control of the functions of the bladder and rectum and there were no deep reflexes. The last time I saw her she was walking down the street and making fair progress, although she used a cane. It is a well known fact that one can get function quite happily in the cord with many of the fibers destroyed and neurologists explain such a case as the one referred to by saying that, though, doubtless, many of the fibers were destroyed, some of them must have remained.

Dr. Corbett has spoken of his experience with dogs. Dogs have had their cords severed and have walked again, but there is a probable material difference between a dog and a man in respect to this particular experiment, and sometimes the return of function in the dog happens so early after section that there could have been little or no time for regeneration in the cord. We may probably assume that some of the reflex paths in the dog are much more satisfactory than those supplied to man, so that the animal can walk again but man may not walk under the same circumstances.

It is often stated that if operation is to be of any value in a cord injury it must be done at a relatively

early period after the trauma, as otherwise the pressure of the hemorrhage and the edema will destroy even those fibers which may retain some vitality. It is well known however that in cord tumors, where great pressure has been exerted on the cord for sometime and where there is at least complete functional loss, an operation, with relief of pressure, may result in return of useful function and it does not necessarily follow, therefore, that, even after trauma, the pressure would be great enough to wholly destroy fibers which might have escaped in the original injury. Furthermore it is known that operation on a cord, even by the best man, often results at least temporarily, in an increase of symptoms and quite possibly in even some permanent loss. With this point in view and with the known fact that compression paraplegia may recover or at least improve even with the most advanced symptoms, it appears to me safest to assume a very conservative attitude and not to do an early operation in any case except those with reasonable evidence of bony fragments or of foreign bodies as a bullet, actually pressing on the cord or in those cases where progressive increase in the severity of the symptoms suggests a hemorrhage. In any case, whatever one does, one is likely to wish that the other course had been taken.

One can only hope that with persistent efforts in the investigation of this problem, such as Dr. Corbett has been making, we may ultimately reach a point where our diagnosis of the degree of destruction in cord injuries will be more accurate and the results of our treatment will be more happy.

DR. CORBETT (closing the discussion,: If I may take a minute or two to emphasize what I hinted at in my animal experiments, I will say that we have believed for a long time that when the cord was cut, no regeneration would take place. From the observations of Ballance and a great many others it is stated nerves will only regenerate through the agencies of the neurilemma canal. That statement is not true except in the presence of scar tissue. Our experience shows that regeneration of neuraxes can take place without the scar tissue. I am not willing to accept the regeneration of the cord as being perfectly hopeless, and it is for that reason I made these experiments of the anterior roots. It seems to me, if we can get a few neuraxes switched around or bridged widely enough to penetrate the roots that have the sheath of Schwan, if we can enter the cord where there is no scar tissue, regeneration must be possible. The study I have given to these animals bring back hope that we may yet regenerate the spinal cord.

The other purpose I had in presenting the paper was to show the impossibility of making a diagnosis of complete lanceration of the cord, and that where a patient has had a complete laceration just as good care should be taken of that patient as possible so as to give him a chance for recovery. I have seen patients recover from spinal injury to die of a urinary infection or to die of decubitus ulcer infection, because the cases were thought to be hopeless and were neglected.

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EDITORIAL

THE SO-CALLED SHEPPARD-TOWNER BILL

This Bill "mothered" by the Children's Bureau has been introduced in two sessions of Congress. It was passed by the Senate, was reported out of the Committee on Interstate and Foreign Commerce in the House of Representatives, and died in the Committee on Ways and Means. The official title of the Bill is "A bill for the protection of maternity and infancy and providing a emthod of co-operation between the government of the United States and the several States." This Bill will appear again in the present session of Congress and its passage has already been advocated by President Harding in his message. A Bill was introduced into the Senate and House of this state to provide for state activity in this line of public health work, thus taking advantage of the provisions of the Sheppard-Towner Bill. This Bill was reported out favorably from the Committees, carrying no appropriation from the state.

Briefly, the provisions of the national Bill are as follows. The purpose is to establish cooperation between the federal government and the several states in improving the care and providing instruction in the hygiene of maternity and infancy. The Chief of the Children's Bureau as executive officer is to be assited by an advisory committee to consist of the Secretary of Agriculture, the Surgeon-General of the United States Public Health Service, and the United States Commissioner of Education. The amount appropriated consists of $480,000 each year, $10,000 of which would be paid annually to each state for administering the work.

Further appropriation is authorized to be divided, among the states carrying on this work, on a per capita basis. This is $2,000,000 for the fiscal year ending June 30th, 1921. This sum is increased by $400,000 each year for the ensuing five years. Any state may create a state board of maternal and infant hygiene or establish a division in its state board of health to administer the provisions of this Act. These state boards shall have all necessary powers to cooperate with the federal board. Not to exceed 5 per cent of the amount appropriated is to be used for administrative purposes by the federal board. Any state desiring to secure the benefits of this Act must submit detailed plans to the federal board for approval. These plans shall include those of administration, instruction through public nurses, consultation centers, etc., division of medical and nursing care for mothers and infants at home or in institutions. It further provides thatt not over 25 per cent of the sum granted to each state may be used to provide popular non-technical instruction on the hygiene of infancy, maternity, etc., through state universities, land grant colleges, or other public educational institutions by means of extension courses.

These Acts should be carefully considered by the medical profession as they vitally affect the relation of the medical profession to the public. Maternal and infant welfare and hygiene have been much neglected in the public health and welfare activities of this country. The furtherance of public health and welfare is the chief object of the medical profession and it should, therefore, coperate in any attempt to accomplish this end. It is however to be kept in mind that anything which reacts to lower professional standards or efficincy reacts to the detriment of public health and welfare. Anything which improves the medical profession and raises it standards and efficiency will have a very favorable effect on public health and welfare. If lay boards through governmental agencies can improve the medical profession and widen its scope by improving the methods and opportunities of service to the public, a great good would be ac-

complished. If, on the other hand, conditions are created which for any reason make the profession less attractive to independent men of intellect, the reverse will be true. No one can deny that this is another step in the direction of state medicine. It is a matter of grave concern and for careful consideration by both the medical profession and the lay public. If governmental agencies could have unbiased and well considered advice from carefully chosen members of the medical profession as well as from lay individuals, a sane progress in these matters would be much more certain. **F. L. A.**

VITAMINES AND INFANT FEEDING

It is generally recognized that mother's milk is the ideal for infant feeding. Owing to the variations in the composition of mothers' milk it seems evident that the infant is not tied down to an absolute quanititative formula, but permits of fairly wide variations in the relative proportions of the constituents of milk.

There may be two reasons for this. One is its ability to store certain elements, such as iron, for instance, which is very deficient in mothers' milk, but which is stored in the liver of the newborn in sufficient quanity to tide over a few months on an iron-free diet without noticeable anemia. Another possibility is that it may absorb selectively relatively more of those ingredients which it most needs.

An infant fed on breast milk has what might be called a mild diarrhea. Its food is of such a nature that 100 per cent might be digested and absorbed so that the feces would consist of nothing but bacteria and intestinal secretions, but actual fact, the bulky feces show a considerable proportion of undigested food, or at least, unabsorbed food. We might then compare the nutrition of an infant to that of a marine plant whose growth is only limited by that substance which is deficient in amount (and which is fixed nitrogen) in case of the plant. We do not know the total composition of human milk, and therefore we cannot modify cows' milk so as to be exactly like any sample of human milk, and, owing to the large variation of the composition of human milk, it is clearly impossible to make modified milk conform closely to the mapority of samples of human milk. What we want to do is to take an average figure of human milk and adopt a single formula for modified milk, which is of the same approximate composition as the average human milk in so far as known constituents are concerned. In regard to the minor constituents which are known qualitatively but not quantiatively, we might adt a slight super-abundance of these.

The vitamines are constituents which have never been isolated, but may be determined roughly quantitatively by feeding experiments on small animals. We do not know exactly how many vitamines there are, but we know that there are three types, called A, B and C. Type A includes a growth promoting substance, and anti-ophtnalmia substance, and an anti-rachitic substance. Whether all these substances are the same, need not worry us unduly. We know, for instance, that cod liver oil promotes growth and cures nutritional ophthalmia and rickets. Other products containing vitamine—A might not cure rickets in a spectacular manner simply because of the lesser concentration of the vitamine. For inctance, Zilva reports that some samples of rank, dark-colored cod liver oil contain 270 times as much vitamine—A as is contained in butter fat. The usual dose of cod liver oil is three teaspoonfuls a day. It would therefore require about 4000 teaspoonfuls of cream to give the same dose of vitamine—A which is clearly impossible to administer. Therefore, we cannot say with certainty that cream and spinach are lacking in the anti-rachitic vitamine.

The statements that phosphorous cures rickets are also open to quantitative objection. There is often enough anti-rachitic vitamine in infants' diet for slow recovery from rickets without the use of medicine. Therefore, isolated instances of recovery after the administration of phosphorous would only be conclusive in case the diet was absolutely freed from vitamine—A. Phosphorous is entirely absent from all our food, and therefore it cannot be maintained that those infants who do not get rickets are protected by phosphorous in their food. Phosphorous is taken in food in the form of phosphoric acid, which is harmless. Phosphorous is a deadily poison, and many infants have been killed by a mistake in the amount of phosphorous administered.

That cod liver oil cures rickets has been repeatedly proved. The most spectacular experiment is that of Drs. Park and Macollum, who showed that cod liver oil administered to rachitic rats caused a marked deposit of calcium salts in the rachitic ends of the femur, in three to five days.

Class B of vitamines includes the growth promoting substance and an anti-neuritic substance. Wether these are the same has been disputed, but

they occur together in our foods. Nutritional polyneuritis or beri-beri, as it is called, occurs even in breast-fed infants in countries where beri-beri is common among adults. The growth promoting substance is probably often deficient, as shown by the increased growth rate of under-nourished infants, observed by many workers on administering vitamine-B in concentrated form.

Vitamine-C cures and prevents scurvy. It is perhaps the best known in its affects. Scurvy is the best known deficiency disease, in fact, its cause is so well known that it has been largely eliminated among infants. When patent baby food were first put on the market, scurvy became noticeably increased. The same was true when the processes of pasteurization or boiling of milk was first Vintroduced. It has become, however, common practice to administer vitamine-C with artificial feeding.

To sum up, the infants diet should contain a sufficiency or a super-abundance of vitamine A, B and C. Vitamine-B is the most stable and may occur in sufficient quanity in cows' milk, provided the cow is fed on a diet containing it in sufficient quanity, but when cows' milk is diluted, as is usually done in modifying it for infants' feeding, there is very likely to be a deficiency of it. Vitamines A and C are very sensitive to oxidation with the oxygen of the air. This oxidation probably ceases entirely when they are absolutely dry, but increases with the increase in moisture, temperature and sunlight. If oxygen is absent they can be heated to much higher temperatures without destruction of the vitamines.

It is not at all certain that vitamines from different sources are exactly the same. We merely know that they are similar in effect. For instance, the vitamine-C in the citrus fruits is much more resistent than is vitamine-C from another source. The vitamine-A in spinach and cod liver oil is said to be more resistent than that from other sources, but this may not be true. Vitamines are destroyed gradually, and since vitamine-A is so much more abundant in cod liver oil than in butter, for instance, even after nine tenths destruction it might still remain in relatively high concentrations. As a practical matter, the infant can usually be supplied a sufficient quanity of vitamine in the butter fat in the diet, especially if the cow is given sufficient amount of green feed or le aethsvaehvta cient amount of green feed or leaves that have been dried in in such a manner as to preserve the grain color. In case this has not been attained, it may be administered in the form of powdered spinach, mixed with water and fed with a spoon or added to the milk. Powdered spinach also contains vitamine-B.

Vitamine C is best administered in the form of the juice of citrus fruits, sweetened with sugar, and diluted, in case the infant demands a lowered acidity. Sodium bicarbonate may also be used to lower the acidity. Calcium carbonate will do this, and also add calcuim salts to the diet. Yeast may be used as a source of vitamine-B. Fresh yeast has a pleasant taste, but dried yeast varies in taste with the mode of drying and the taste is not usually considered attractive. J. F. McC.

COLONEL SMITH

A man named Smith; a very usual name, but this particular Smith, Colonel Henry Smith, formerly of the British service in India, and now of England, is a good example of a man finding a beaten path to his door because he can do one thing better than any one else.

The actual location of the path was in India where Colonel Smith performed an enormous amount of surgery, undoubtedly more than any surgeon who ever lived, including over 50,000 cataract extractions. This enormous experience has enabled him to perfect a technic which in his hands has proven the most satisfactory in existence, and which has been adopted by his numerous pupils in this country and throughout the world.

Men from the larger cities all over the country have thought it worth while to visit the Colonel in India. One of these, Dr. W. A. Fisher, of Chicago, who has probably had a greater experience with the Smith technic than anyone in America, and who is an ardent admirer of Colonel Smith, recently received a letter in which the Colonel said he was going to visit America. Societies all over the country were notified and many extended him invitations to visit them and demonstrate his technic. He accepted every invitation and has visited Columbus, Dayton, Cincinnati, Dallas, Philadelphia, Buffalo, Chicago, Boston, Swonsocket (now made famous), St. Paul, St. Louis, Kansas City and the Pacific Coast. At Boston he read a paper on "Night Blindness" before the Annual Meeting of the American Medical Asso-

ciation, calling attention to the predominating element of malingering in the cases reported. At the annual meeting of the American Academy of Ophthalmology he presented a paper on "After-Cataract."

The Colonel's visit to St. Paul, under the auspices of the Minnesota Academy of Ophthalmology, seemed in the nature of an endurance test. Seventy-eight cases were assembled at St. Joseph's Hospital by Dr. John C. Harding, all of which were operated in rapid succession. In Colonel Smith one observed a man of large frame, the gray hair and bushy gray moustache indicating his near approach to the three score year mark. A man of few words, he went about his work, smoking a cigar most of the time, apparently oblivious to the ash, and with a familiarity almost bordering on contempt, at least for usual aseptic precautions.

To the majority of the onlookers the Colonel was convincing. It is to be hoped that the cases operated will be recorded and reported.

While Colonel Smith is supposed to have retired, he admits he has not given up "this sort of thing," which is the purely scientific phase of medicine, and which affords the charm to the practice of the profession.

Unfortunately journalism is suffering at present from a nation-wide printers' strike. The June number of Minnesota Medicine was two weeks late in appearing on this account, and this issue is late for the same reason. The timely appearance, in fact the appearance at all, of the next issues depends entirely on the strike. We hope our readers will bear with us in what is an unavoidable situation.

NEWS OF THE HOSPITALS

Dr. Carl C. Chatterton, St. Paul surgeon, has been appointed surgeon-in-chief of the Hospital for Crippled and Deformed Children at Phalen Park. Dr. Chatterton succeeds the late Dr. Arthur J. Gillette.

Dr. E. O. Giere, chief of staff of the St. Paul Hospital, opened his offices on May 16th. John E. Haugen, of the same institution served as chairman for the National Hospital Day Committee of the State. Seventeen student nurses were recently graduated. The address was given by Dr. Arthur Sweeney of St. Paul.

The graduation exercises of Mounds Park Sanitarium, St. Paul, were held on April 27th when eighteen student nurses received their diplomas from Dr. Robert Burns of St. Paul. On May 2d the Alumnae of the Sanitarium held a gathering at The Commodore, St. Paul.

Improvements now under way at the Aberdeen Hospital, St. Paul, will make the institution a three hundred bed hospital.

Dr. Frank Billings, of Chicago, one of America's foremost surgeons, was a recent guest at the City and County Hospital, St. Paul.

In conjunction with National observance of Hospital Day, the Swedish Hospital of Minneapolis broke ground for their new Nurses' Home.

Henceforth Lymanhurst Hospital, Minneapolis, will be operated as a health center for children, according to Dr. F. E. Harrington, City Health Commissioner.

Miss Susan Holmes, superintendent of Nurses at Abbott Hospital, and Miss Bertha Mattick, of Hillcrest Hospital, were among the recently elected directors of the Minnesota State Registered Nurses' Association.

The Norwegian Lutheran Deaconess Hospital held graduation exercises on the evening of May 12th when fourteen student nurses received diplomas.

St. Barnabas Hospital, Minneapolis, has installed a new eighteen ton ice machine manufactured by the Bilter Company, of Milwaukee.

St. Mary's Hospital, Minneapolis, recently entertained the graduating classes of St. Margaret's Academy and St. Catherine's College, educational institutions of Minneapolis and St. Paul, respectively.

Dr. Kano Ikeda, formerly of St. Barnabas Hospital, Minneapolis, has been appointed full-time pathologist at the General Hospital of that city. Dr. A. E. Goedel was recently absent from the hospital to attend the funeral rites of his father who died in Indianapolis. On each Tuesday a Clinical Pathological conference is held from 12:30 to 1:30. Physicians of the city are urged to attend. Commencement exercises were held on May 27th at the Women's Club, Minneapolis. Dr. R. O. Beard delivered the lecture. The Hospital has been repainted throughout, and the Nurses' Home refinished.

The Luverne Hospital, Luverne, Minnesota, will hereafter be under the management of Drs. Wright,

C. L. Sherman, E. O. Thorson and J. B. Stevens, with Mrs. W. A. Wright serving as superintendent. The institution was formerly operated by the late Dr. A. E. Spaulding.

The Nurses' Home of St. Joseph's Hospital, Brainerd, Minnesota, was recently destroyed by fire. The loss was estimated at $5,000.00.

The 1921 legislature has authorized a large bond issue for the erection of Glen Lake sanitorium. Equipment for the building will come from a tax levy. The sanitorium recently opened an addition which will accommodate about ninety patients. A Heliotherapy department will be a feature of the new sanitorium.

LIBRARY SERVICE IN THE HOSPITALS OF ST. PAUL.

1. What is it?
2. Why is it?
3. How is it done?

Books for the sick, Why not? It would be a wise man and a cunning one who could nicely discriminate between books as a library product and as a tool for the social worker. Who, having ever been in a hospital in any capacity, will ask "do patients read, is this service needed?" One cannot forget the eager replies to one's "Would you like a book or a magazine?" their relief, surprise, their gratitude as one made the rounds? What does the quick flocking of nurses about the book cart mean? "My patient wants——" the orderlies come by, one checks a book against the laboratory. There are always off-hours, you know. One superintendent in answer to my request for a list of titles to be used as supplementary reading for her training classes remarked; "I want my nurses to appreciate the board field of nursing; to realize the many opportunities of the nurse of to-day." She herself had been a Red Cross nurse overseas, had worked with the repatries at Evian and later had been loaned by the Red Cross to the Polish government. "I want them to know something besides private nursing, they must read———," and we noted titles.

Who can estimate the value of books in hospitals? There is a Swede who but lately came to this country, and chafes at hospital existence. If only he were back in his own country! His Sweden would make him well again. His eagerness to get at Swedish books was pitiful, it was one of his own kind. There is the pale little youngster of ten with both legs in plaster casts, tuberculous hip who had never been to school. For him an interested volunteer is recruited, who will go regularly to read to him and incidentally teach him to read and write. And what do these patients read? Wholesome, light, entertaining stories that will make them forget themselves. Nothing too academic. "Good literature," merely as such, has no place in the hospital library. Picture-puzzles have their place for the nerve patients.

St. Paul began its library service in hospitals on February 1, 1921 under the joint auspices of the Amherst H. Wilder Board and the Public library. The liason between these two agencies should have a word of comment, marking, as it does, a new field for charity organizations, the Wilder Board being one such. A new field, and a legitimate one, as was decided after discussion, too often closed to libraries and hospitals though lack of funds, experience, or both. Briefly, the St. Paul hospital service is as follows. Twice as many books as beds for each hospital, are kept permanently at the hospitals. The patients come and go but the books remain. Twice a week personal distribution of books by the hospital librarian. The graph shows the field which includes the following hospitals: Bethesda, City and County, Merriam Park, Midway General, Mounds Park Sanatorium, St. Joseph's, St. John's, St. Luke's, St. Paul's, the Miller Hospital, and the Public Health Service Hospital 65. That means a public of 2,000 otherwise practically unserved by the library in the very heart of the community.

It is not out of place here to speak of the Public Health Service Hospitals, scattered about the country for the ex-service men. While there are social workers, the Red Cross, federal vocation assistants and interested outsiders by the scores in these hospitals, there is no government provision for books and their distribution. The American Library Association is generous in its help if there is supervision of the work. In Public Health Service Hospital No. 65, it has been possible to assist the patients to do some interesting reference work. Few of these men are in bed and of those who are, many are surgical cases and can read the second day or so after the operation. They read everything from history and travel to a treatise on the Steel Square, from highly technical Hiscox to Alger. A list of note-book jottings shows requests for poetry, real estate law, Drummond's "Habitant," history (ancient and modern), Jane Grey, the National Geographic, James' Psychology, Darwin's Descent of Man, Biography of Wilson, book on letter-writing and small dictionary, a first book on the automobile, bee-keeping, tree-grafting, a history of the Black Prince (had seen the B. P.'s cave near Bordeaux). A new man in his first experience of the library says "Books? Yes, have you got any foreign history or the Greek classics?" A cook of Co. D, 27th Engineers, the men who rebuilt the bridge at Chateau Thierry under German fire lies flat on his back two years and a half after the armistice. "Want another book?" "Yes, one just like this," and he reaches for his other one, Sir Philip Gibbs', Now it can be Told. "That's a good one," he added, "I read it all yesterday." A man of no education! A Greek, his seven years in this country spent in the mines in Montana and Alaska, rejects any proffers of a book. Later in front of the shelves, he vouchsafes, "Oh, here's where your books are." "You're a Greek, aren't you," came the answer. "Yes, have you got any Greek books?" "Yes," and half in jest Sophocles' Antigone was poked at him. "Sophocles," he murmured, "But I know him—but it's English, isn't it? There aren't any more like

him. The young Greeks aren't like those old ones." A nerve case committed to bed asks for something on the theory of music, harmony and counter point. To the vocational teacher go books on design, bookbinding, book rugs, etc. The incidents are as numerous as are the patients, and more enlightening than statistics.

Hospital statistics, by nature of their being, must remain approximate rather than precise. A book charged to a ward may be read by every person in it and often is. Magazines are not counted at all in the record of circulation. In this Public Health Service Hospital No. 65 the average during the past thirty days has been about 150 patients. Our figures show that 400 books is not too high a figure for the same length of time. Easily half of that number are non-fiction. In the other hospitals the average is lower. It works out that about every third person takes a book. Some are too old, some too young, some are dying, some have forgotten their spectacles, some ought not to read. But even including all the non-readers it is true that about every third patient wants to read or will read if properly approached.

And where will this end? Only the books and the limitations of the person in charge will answer that. To human service there is no end.

Miss Perrie Jones, Hospital Librarian.

OBITUARY

Thomas Leger Firth Armitage, Princeton, Minn. Graduate of Medico Chirurgical College, Philadelphia, 1892. Died June 3, 1921. Dr. Armitage was a successful popular physician of the old school, highly esteemed in the locality where he had lived and practiced for twenty years. Member of the A. M. A., American Health Association, American Association for Advancement of Science, Royal Society of Arts, London, Fellow Hon. Council, North British Academy of Arts, England, and a 32d degree Mason.

E. S. Frost, M. D., Minneapolis, Minn., born at St. John, Canada, April 11, 1843; graduated from the University of Pennsylvania, 1868. Died May 3, 1921.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY.

The Southwestern Minnesota Medical Society held its 37th semi-annual meeting at Fulda, Minnesota, on May 12th. The attendance was the largest in years, fifty-two physicians and surgeons being present. Dr. F. G. Watson, of Worthington, acted as chairman and Dr. E. G. McKeown, of Pipestone, secretary. The program included the names of several well known physicians of Minnesota. A banquet was served in the evening. The next meeting of the society will be held at Worthington.

NORTHERN MINNESOTA MEDICAL ASSOCIATION

The annual meeting of the Northern Minnesota Medical Association was held on May 24th and 25th, 1921, at Detroit, Minnesota. This, the first meeting of the Association, was attended by some one hundred and twenty-five physicians, and the register included the names of about fifty ladies. The program included the names of many well known physicians of the state, and the subjects of the papers were representative of the various specialties.

The public meeting following the banquet was addressed by Drs. Sweeney and Dodson. The idea of allowing the public to benefit from addresses by members of the profession is in keeping with the trend of the times, and the practice might well be adopted by all medical conventions.

This association meets once a year, and the next meeting will undoubtedly be in the latter part of May, 1922.

The following officers were elected:

Dr. C. O. Estrem, Fergus Falls, President; Dr. Roy E. Swanson, Alexandria, Vice President; Dr. W. L. Burnap, Fergus Falls, Secretary-treasurer and Chairman of Program Committee.

Board of Censors: Dr. O. O. Larson, Detroit; Dr. O. F. Melby, Thief River Falls; Dr. O. E. Lokken, Crookston.

MINNESOTA STATE MEDICAL ASSOCIATION

The annual meeting of the Minnesota State Medical Association will be held at Duluth August 24th to 26th inclusive. The Council will meet at 10 a. m. August 24th, and the House of Delegates at 2 p. m. on the same day. The Scientific Program will occupy August 25th and 26th.

The secretary of the proper section should be communicated with in regard to papers to be presented.

Surgical Section—
Dr. J. T. Rogers, Hamm Bldg., St. Paul.
Dr. T. L. Chapman, Secy., Fidelity Bldg., Duluth.

Medical Section—
Dr. S. H. Boyer, Lyceum Bldg., Duluth.
Dr. C. B. Wright, Secy., Syndicate Bldg., Minneapolis.

OF GENERAL INTEREST

Dr. Arthur A. Kahala, of Erskine, attended the surgical clinics held at Rochester during May.

Dr. Hugh Reynolds, of Hibbing, is taking a post-graduate course in medicine in Minneapolis.

Dr. L. E. Claydon, of Red Wing, has recently returned home from a six months trip around the world.

Dr. Franklin W. S. Raiter, of Cloquet, is in Chicago, where he is recuperating from his recent operation.

Dr. Carl L. Larsen, of St. Paul, has returned to Vienna for further study of diseases of the special senses.

Dr. J. L. Mulder, of Chaska, has moved to Cavalier, N. D., where he will continue in the practice of medicine.

Dr. Wallace H. Cole, of St. Paul, was married on June 4, 1921 to Miss Mary Crunden, of St. Louis, Missouri.

Dr. B. S. Bohling, of Sandstone, spent a month in Chicago recently in the study of medicine and hospital work.

Dr. B. R. Karn, of Ortonville, has been taking a special course in medical and surgical work in Minneapolis the past few weeks.

Dr. George Earl, of St. Paul, has recently returned from Philadelphia where he spent several months in postgraduate surgical study.

The degree of Doctor of Laws was conferred upon Dr. C. H. Mayo at the commencement exercises of Northwestern University, June 15.

Dr. W. A. Lee, of Fergus Falls, has been spending the past few weeks in Chicago where he has been taking post-graduate work in medicine.

Dr. Crandall, formerly associated with Dr. Oliver, of Graceville, has located at Browns Valley where he has purchased the practice of Dr. McGeary.

The third annual meeting of the Association of the Resident and Ex-Resident Physicians of the Mayo Clinic was held in Rochester, May 18 and 19.

Dr. A. J. Paulson, of Thief River Falls, returned recently from Minneapolis, where he attended a physicians and surgeons short course at the University.

Dr. Walter Timme, attending Neurologist of the New York Neurologic Institute, gave a Mayo Foundation lecture April 29; his subject was, "Endocrine glands."

Dr. F. J. Souba, of Minneapolis, announces that he is severing his connection with the Sivertsen Clinic, and is opening offices at 600 Physicians and Surgeons Building.

The Union Clinic, of Willmar, Minnesota, announces the addition to its staff of Dr. H. V. Hanson, who will specialize in diseases of the eye, ear, nose and throat.

Dr. C. Curry Bell, who has been at the City and County Hospital, St. Paul, as chief surgical interne for two years, has opened his office at 1014 Lowry Bldg., St. Paul.

Dr. P. C. Pilon, of Paynesville, sailed for Europe May 15th. He will tour Belgium, France, Switzerland and Germany, and plans to study in the large hospitals of the countries he visits.

Dr. Walter E. Scarborough, of Waterville, is making plans to locate in Elysian where he will engage in general practice after he returns from Chicago where he will take a technical course in surgery.

Dr. W. B. Heagerty, of Mazeppa, has sold his practice to Dr. L. F. Sutton, of St. Paul. Dr. and Mrs. Heagerty have gone to California for a visit, and expect to look for a new location in the west.

Dr. R. E. Farr, of Minneapolis, presented papers before the Spokane Medical Society on June 28th; the Seattle Surgical Society on June 29th, and the Tri-State Medical Association on June 30th, at Portland, Oregon.

Dr. D. P. Maitland, of Jackson, who has been spending the greater part of the winter in California, has recently returned to his home after a post-graduate course in medicine in Chicago. He will resume his practice at Jackson.

Dr. H. E. Robertson, director of the department of pathology and public health at the University of Minnesota, has been transferred to the graduate school at the Mayo Foundation, Rochester. Dr. Robertson will be professor of pathology at Rochester.

Dr. W. J. Gamble, of Rochester, has been in Washington, D. C., where he received special instruction in eye, ear, and nose work. He will interest himself in this special field when he takes up his new duties in government health work, at Minneapolis.

Dr. W. J. Mayo and Dr. C. H. Mayo have recently received notification that Honorary Fellowships in the Royal College of Surgeons of Ireland will be conferred upon them as soon as they can attend the ceremony which will be held in the College Hall.

Dr. H. B. Weinburgh, of Waterville, has returned after a year's absence spent in post-graduate work at various hospitals, the past month having been spent at the Mayo Clinic. He has made a special study of diseases of the eyes, and will add this to his general practice.

The Watonwan County Medical Society held its regular summer session in May at Madelia. The meeting was attended by practically all of the members of the society. Dr. A. F. Schmitt, of Mankato, visited the meeting and gave an interesting demonstration of x-ray work.

Dr. Victor C. Vaughn, Dean in the Medical School of the University of Michigan, Dr. J. M. T. Finney, Professor of Clinical Surgery, Johns Hopkins Medical School, and Dr. Frank Billings, Professor of Medicine, Rush Medical College, recently visited Rochester to observe the work of the Mayo Foundation.

Sir Wilmot Harrington, Chairman of the Committee on Medical Education of the University Grants Committee, and Sir Walter Morley Fletcher, Secretary of the Medical Research Council, of London,

guests of the Rockefeller Foundation, visited the Mayo Foundation and the Mayo Clinic April 26 and 27.

Dr. M. C. Linden has finished a year as chief medical interne at the St. Paul City and County Hospital, and is associated with Dr. Bevan in Chicago. Dr. Linden will devote himself to surgery and the medical internship just completed, together with a year previously spent with Dr. Le Count, of Chicago, which was spent as fundamental training.

At the commencement exercises of the University of Minnesota the degree of Master of Science in Surgery was conferred upon the following Fellows in the Mayo Foundation: L. P. Bell, J. M. Hayes, E. M. Johnstone, G. D. Mahon, A. E. Osterberg, F. R. Sanderson, and G. E. Sutton. Miss Winifred Ashby received the degree of Doctor of Philosophy.

Dr. Walter R. Ramsey, of St. Paul, has sailed with his family for Europe. The doctor will attend the second International Congress for the Protection of the Children, which will be held at Brussels, July 18 to 21, 1921. The subject of the paper which Dr. Ramsey will read at this meeting is "What are the most important means for the protection of infants against tuberculosis".

Dr. H. G. Irvine of Minneapolis recently attended the meeting of the American Dermatological Association at Swampscott, Mass., and the A. M. A. at Boston. He read a paper before the Section on Dermatology and Syphilis entitled "Two Hundred and Fifteen Cases of Syphilis After Five Years." Dr. Irvine was elected vice chairman of the section for the ensuing year.

Dr. W. J. Mayo has recently returned to Rochester after three weeks' absence attending meetings. He delivered lectures before the medical alumni of the State University of Iowa, the Fourth Judicial District of the Illinois State Medical Society, a joint meeting of the International Medical Society and Surgical Society at Washington University, and the St. Louis Medical Society.

The State Board of Health announces the discontinuance on July 1, 1921 of the Pasteur Institute which has been located on the University Campus at Minneapolis since 1907. The diagnosis work for the detection of rabies in animals will be continued under the Division of Preventables Diseases, University Campus, Minneapolis, and the State Board of Health will furnish physicians and health officers a list of the commercial houses which furnish anti-rabic vaccine, upon request.

The reason for the discontinuance of this service is the fact that the expense of maintaining the institute has been greater than would seem justified by the few number of cases in the state within the past three years. The preparation too of anti-rabic has so developed that the vaccine is at present being prepared and sold at a price by approximately a dozen commercial houses with satisfactory results.

Dr. W. J. Mayo delivered the Henry Jacob Bigelow Medalist Address before the Boston Surgical Society June 6th at which time he was awarded the Bigelow Gold Medal. The Henry Jacob Bigelow trust fund was established in 1915 by Dr. William Sturgis Bigelow, of Boston, in memory of his father. The income is used by the Boston Surgical Society to award medals to persons who have made valuable contributions to the advancement of surgery in this country or in other countries. Dr. Mayo is the first person to receive the Henry Bigelow Medal.

Dr. Frank Whitmore, of St. Paul, has recently returned from a few months stay in Vienna where he took advantage of the clinics in nervous and mental diseases. He reports Vienna has hitherto been a neglected field for post-graduate study in nervous diseases. After spending three months in the Nervenklinik under Wagner Von Jauregg Dr. Whitmore was impressed with the amount of diversity of the clinical material and his excellent method of presenting it. It must be remembered, however, that psychiatry is an exceedingly abstract subject and unless one is able to understand both German and the Vienese patois the course may be unsatisfactory in the fact that Wagner himself speaks very little English. Freud and his students are rather outside the pale of the University courses, but their mode of teaching and way of approaching the study of abnormal psychology is so interesting that one is well repaid for spending some time with them.

NEW AND NON-OFFICIAL REMEDIES

During May the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

The Gilliland Laboratories:
Acne Mixed-Vaccine-Gilliland
Hoffman-LaRoche Chemical Works:
Pituglandol
Lederle Antitoxin Laboratories:
Cholera Vaccine (Prophylactic)-Lederle
Plague Vaccine (Prophylactic)-Lederle
H. A. Metz Laboratories: ....
Silver Salvarsan
Silver Salvarsan 0.05 Gm. Ampules
Silver Salvarsan 0.1. Gm. Ampules
Silver Salvarsan 0.15 Gm. Ampules
Silver Salvarsan 0.2. Gm. Ampules
Silver Salvarsan 0.25 Gm. Ampules
Silver Salvarsan 0.3. Gm. Ampules
Seydel Manufacturing Co.:
Guaiacol Benzoate-Seydel

Yours truly,
Secretary,
PHARMACY AND CHEMISTRY.

Silver Arsphenamine.—Sodium Silver Arsphenamine.—The sodium salt of silver-diamino-dihydroxy-arseno-bronzene, containing approximately 20 per cent of arsenic and approximately 15 per cent of silver. The action and uses of silver arsphenamine

are essentially those of arsphenamine (see New and Nonofficial Remedies, 1921, p-41). Its claimed advantage over other arsphenamine preparations is said to be due to the silver which improves the chem-therapeutic index. In the presence of organic diseases of the heart, aneurysm, aortitis as well as other parenchymatous diseased conditions of the glandular structures, silver arsphenamine should be used with great caution and in small doses. The dose of silver arsphenamine is from 0.1 to 0.3 gm. for adults. To administer silver arsphenamine the product is dissolved in sterile distilled water without application of heat and without application of heat and without shaking and then diluted with 0.4 per cent sodium chlorid solution to make 20 c. c. per 0.1 gm. of silver arsphenamine (Jour. A. M. A., May 7, 1921, p. 1312).

Suprarenalin.—A brand of epinephrine, N. N. R. (see New and Nonofficial Remedies, 1921, p. 107). Marketed only in the form of Suprarenalin Solution.

Suprarenalin Solution.—One thousand parts contain suprarenalin sulphite equivalent to one part of suprarenalin in physiological solution of sodium chlorid without addition of other preservatives Armour & Co., Chicago.

Sterile Ampules of Benzyl Benzoate- H. W. D. O. 5 Cc.—One cc. contains 0.5 c. c. benzyl benzoate- H. W. & D. (see New and Nonofficial Remedies, 1921, p. 61) diluted with olive oil. Each ampule contains more than 1 c. c. Hynson, Westcott & Dunning, Baltimore, Maryland.

Silver Diarsenol.—A brand of silver arsphenamine, N. N. R. (see Jour. A. M. A., May 7, 1921, p. 1312). Silver Diarsenol is marketed in ampules containing respectively 0.05 Gm., 0.1 Gm., 0.15 Gm., 0.2 Gm., 0.25 Gm. of silver diarsenol. Diarsenol Co., Inc., Buffalo, N. Y. (Jour. A. M. A., May 14, 1921, p. 1353.)

Mercurochrome 220.—Soluble.—The disodium salt of dibromo oxymercury fluorescein, containing 23 to 24 per cent of mercury, Merccrochrome-220 Soluble is a strong and rapidly acting germicide. It is active in urine 1: 1,000 solution, killing Bacillus Coli and Staphylococcus aureus in this medium in one minute. It penetrates the tissues readily. The drug is tolerated in a strength of 1 per cent by the bladder, renal pelvis and urethra. A 2.5 per cent solution applied to the anterior urethra causes only temporary discomfort. The toxivity, when tested by intravenous injection into rabbits, is rather high. Mercurochrome-220-Soluble has been used in cystitis, urethritis and in chancroidal ulcerations also in affections of the eye and ear. Hynson, Westcott & Dunning, Baltimore, Maryland. (Jour. A. M. A., May 21, 1921, p. 1403.)

PROPAGANDA FOR REFORM

Aspirin or Acetylsalicylic Acid.—For many years the Council on Pharmary and Chemistry, and the Journal of the American Medical Association have been urging physicians to avoid using proprietary nonproprietary name. Two substances have been especially referred to in this connection, hexamethylenamine and acetylsalicylic acid. Many years ago, hexamethylenamine was found to be an effective therapeutic agent, especially as a urinary antiseptic. Since it was a well known chemical it could not be patented. A commercial firm, however, seized the opportunity and coined the name "urotropin" and advertised it. As a result the proprietary name became so fixed in the minds of physicians that some still use it in their prescriptions instead of hexamethylenamine. Acetylsalicylic acid was patented and the trade name "Aspirin" coined for it by the predecessors of the Bayer Company. During the patent monopoly both physicians and the public became familiar with the term Aspirin. When the patent expired, physicians continued to prescribe Aspirin, even though the drug was available under its proper name, acetylsalicylic acid. Having acquired the rights to Aspirin, the Sterling Products Company, under the name of "The Bayer Co.", has during recent years attempted to impress on the lay mind that there is no satisfactory Aspirin, except Aspirin Bayer. Recently a suit has been decided in which the Drug Company from selling acetylsalicylic acid under the name aspirin. The court holds that, since the public knows the drug as Aspirin only, the pharmacist may sell any brand of acetylsalicylic acid to the public when Aspirin is called for. On the other hand, manufacturers, pharmacists and physicians know the term acetylsalicylic acid and know that the term Aspirin was coined by the Bayer concern and hence, when a physician writes for Aspirin in his prescription only the Bayer product may be supplied. Physicians should avoid the term "Aspirin" and instead prescribe "acetylsalicylic acid" (Jour. A. M. A., May 14,1921, p. 1356).

Eruption after Luminal.—Luminal has been reported by two authors as producing an exanthem simulating urticaria: by two others an eruption simulating measles: by three, as simulating scarlet fever: and by two, as an unclassified drug eruption (Jour. A. M. A., May 28, 1921, p. 1517).

Tekarkin.—Many physicians have received a sixteen page pamphlet "Therapeutic Leaves." "Therapeutic Leaves" purports to be a periodical, published as "a medium for the dissemination of knowledge pertaining to therapeusis." Actually it is an advertising medium dealing with the products of the National Bio-Chemical Laboratory "Osmo-Calcic Solution," "Tekarkin" and "Osmotic Mangano-Potassic solution." These three preparations are said to be the formulas of Edward Percy Robinson, who lives in Mount Vernon, N. Y., and has an office in New York City. They are used by Dr. Robinson in the treatment of cancer. A package containing about 65 minims of Tekarkin and one ounce each of the other preparations sells for ten dollars. Most of the material in "Therapeutic Leaves" is a rehash of four papers published by Edward Percy Robinson in the New York Medical Record. In these Robinson advanced the theory that cancer is caused by an

excess of sodium chlorid in the blood and tissues, and that it can be cured by administering a solution of potassium nitrate. Towever, "Homemade solutions", says Dr. Robinson, "are apt to be disappointing," and hence a solution of this chemical is sold as Tekarkin. This dilute potassium nitrate solution sells at the rate of sixty-seven dollars an ounce. At one time Dr. Robinson specialized in "facial contouring." Except for the articles that have been published in the Medical Record, literature does not indicate that Edward Percy Robinson can lay claim to special knowledge of or skill in the treatment of cancer (Jour. A. M. A., May 28, 1921, p. 1514.)

Vaccination against Influenza:—Prophylactic vaccination against influenza was practiced extensively during, but mostly following, the recent epidemic of the disease. In some districts stock cultures were employed; in others a culture of the strain or strains isolated during the epidemic, and in still others a mixed vaccine. McCoy presented his impression, as gained from the uncontrolled use of these vaccines,. that while therapeutically they might be of value in the prevention of influenza, yet in every case in which they were tried under perfectly controlled conditions, they failed to influence either morbidity or mortality. In an elaborate study, Jordan and Sharp conducted observations on approximately six thousand persons. About one half of these were vaccinated with a saline suspension of a standardized mixed vaccine; the remaining half were not vaccinated. The influenza attack among the vaccinated numbered 4.1 per cent: among the unvaccinated the morbidity from this disease was 4.8 per cent. (Jour. A. M. A., May 28, 1921, p. 1503.)

Electrargol Omitted from New and Nonofficial Remedies:—Electrargol-a preparation of colloidal silver-was admitted to New and Nonofficial Remedies in 1914. In 1918, Fougera & Co., was advised of unwarranted claims which were being made for Electrargol and notified that the product would be omitted from New and Nonofficial Remedies unless a thorough revision of the claims was made in a reasonable time. As the reply of Fougera & Co. indicated that a genuine effort was being made to comply with the request of the Council, Electrargol was retained for the 1919 edition of the book. A reply was received from Comar & Co., in 1919. This reply was a refusal, with one exception, to modify the claims objected to. In view of this refusal to modify the claims, with one exception, the Council directed the omission of electrargol from New and Nonofficial Remedies (Abstracted from Reports Council on Pharmacy and Chemistry, 1920, p. 78).

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:
F. J. HIRSCHBOECK,
DULUTH CLINIC, DULUTH
THOMAS A. PEPPARD
LA SALLE BLDG., MINNEAPOLIS

THE PATHOGENESIS OF ACUTE LEUKEMIA: Report of a case of acute myeloblastic leukemia with the association or complication of Vincent's angina. Maurice Packard and Edward P. Flood (Am. Jour. Med. Sc. Dec. 1920). A case is reported in detail, with the clinical history, the clinical, pathological findings and the social service investigations. The finding emphasized is the presence of the spirilla and fusiform bacilli in the stained smears of the mouth lesion. The authors are impressed with the the infectious like type of onset and course of the disease.

The contention that leukemia is a disease of the blood has been discarded practically since Neumann in 1870, showed the marrow lesions in leukemia. The exciting cause, however, of the bone marrow and lymphoid tissue involvement still is obscure.

Warthin thinks an argument against infection is the widespread occurrence of leukemia in animals, corresponding more particularly to a neoplastic growth. However, the peculiar remissions which occur so frequently do not correspond to the usual course of a tumor. Occasionally, also, we have bona fide cases of spontaneous cure according to the authors. No specific organism has ever been isolated, and yet there is a great deal of evidence that the basic factor in its production is an infection.

Cabot reports a case of the development of the disease in a nurse while nursing a leukemic patient, and on two occasions epidemics have been reported —one in Austria in 1905, and one in France in 1912—although in the latter case the evidence is not impregnable. Leukemic mothers have given birth to healthy children. It is hard to establish also as to whether the infection in the mouth is due to a secondary invasion or whether it is primary. Rotky, in 1900, stated that the blood in leukemia has no agglutinating power to bacteria, explaining the apparent incapacity for the production of antibodies, and the lack of resistance in leukemic patients, to otherwise harmless infections. Sondern feels that in a number of instances Vincent's organisms might have been the exciting factor. In twenty-two cases he found the organisms, and in two cases he is convinced that it preceded the leukemia. He reports two recoveries, in which nine years elapsed in one case before the blood returned to normal, and five years in another. The writers report that they occasionally see severe lymphemias which recover, and they hesitate to give a hopeless prognosis.

The authors do not quote Dr. Head's masterly

article on acute lymphatic leukemia presented in a recent number of this Journal, in which he cites a case in which the Vincent organism was found.

When recovery follows after a supposed case of acute leukemia, the question of a correct diagnosis is not incontrovertible.

F. J. HIRSCHBOECK.

THE EFFECT ON BLOOD PRESSURE AND THE NON-PROTEID NITROGEN IN THE BLOOD OF EXCESSIVE FLUID INTAKE: Joseph L. Miller and J. L. Williams (Am. Jour. Med. Soc. March, 1921) Mohr, in Von Noorden's clinics, thought that a reduction in the daily output of urine below 1200 c. c. often led to nitrogen retention, and that the maximum nitrogen elimination was obtained with a daily secretion of 1500 c. c. Von Noorten urged that this optimal output of 1500 c. c. per day was an ideal to be attained.

Clinical cases of nephritis have been more intensively studied recently, particularly by Foster and Davis. They found that when the urine output was reduced below 1000 c. c. nitrogen retention resulted, and when the urinary secretion reached 2000 c. c. daily the nitrogen output exceeded the intake.

Minkowski called attention to the fact that uric acid elimination was increased materially by drinking water freely.

Miller and Williams have performed some careful experiments on patients to note the effect of increasing the fluid intake to a very high point, by the use of the Rehfuss tube with duodenal instillations. Observations were carried out on three patients, one a typical case of chronic gout of ten years duration, the other two, cases of hypertension—one with a very slight and one with a very decided increase in the non-proteid blood nitrogen. Neither patient had edema, and the elimination of water through the kidneys was satisfactory. During the period of observation the patients were on the hospital nephritic diet, with about 50 or 60 grams of proteid per day. Protocols of the three patients are published in all minutiae, and their conclusions are that large amounts of fluid may cause a very decided increase in the blood pressure, depending upon the promptness with which the kidneys function in excreting the enormous amount of water. They found the treatment to be without any apparent influence on the urea nitrogen in the blood, but in two of the three cases the uric acid in the blood was definitely lessened. This was probably entirely due to the treatment, as following the discontinuance of the water instillations there was an increase to the previous levels fairly promptly. Estimation of the nitrogen output in the urine during the period of observation was not determined.

F. J. HIRSCHBOECK.

SACCULAR ANEURYSM OF THE DESCENDING THORACIC AORTA: Ernest S. Du Bray (Am. Jour. of Med. Soc., March, 1921).

Occurrence:—

Aneurisms of descending aorta are least common of all aneurisms, only 3 cases out of 64 autopsies at Johns Hopkins (Osler).

Diagnostic Difficulties:—

3 groups of descending thoracic aneurism.

1. Symptoms only—no phys. signs or signs not characteristic.
2. Cases suggesting malignant growth.
3. Obscure chest symptoms not suggestive of aneurism or tumor.

Anatomical Considerations:—

Aneurisms descending aorta frequently silent because of position.

2 groups of structure involved which give clinical evidence.

I. a. Spine, vertebrae and spinal nerves
   b. Lung, pleura and bronchi.
   c. Trachea and Oesophagus.

II. a. Pericardium and heart.
   b. Other great thoracic vessels (Pulmonary A. and V.)
   c. Stomach.
   d. Thoracic Duct.
   e. Diaphragm.

Rupture of Aneurisms in General:—

In 110 aneurisms of descending aorta
15% unruptured at death.
66% ruptured.

Slightly more liable to rupture than aneurisms elsewhere. (Arnold).

Most common termination of these aneurism is rupture into left pleural cavity.

Erosion of vertebrae in 26 out of 75 cases.

External tumor in only 6 out of 75 cases.

Clinical Diag. missed in 50%. (Wilson).

Hemoptysis:—

Case with copious and numerous hemorrhages with death delayed. (Clark).

Autopsy:—

Heart displaced to right—Left chest—abundance of clotted blood and separated serum.

Right lung—moderate grade emphysema.

Left lung—some compressed—point of rupture posteriorly at middle.

Mechanism of hemorrhage:—

1. Direct—from sac into air passage.
2. Indirect—result of pressure on air passages.
3. Passive congestion. (Hall).

Pain:—

Prominent symptom. extraordinarily severe.

Nocturnal exacerbations, does not respond to medication.

3 types.

1. anginal.
2. due to pressure.
3. neuralgic.
   (esp. when spine is eroded).

Mechanism of pain.

1. Increased tension of walls, due to stretching of nerves in the aorta.
2. Pressure pain with coexisting inflammation. Digitalis often augments pain by increasing force of left ventricle and by raising arterial tension. (Oliver).

Cough and Dyspnea:—

Nearly constant features of aortic arch involvement less constant in descending aorta.

Bronchorrhea and Bronchiectasis:—

Due to pressure on main bronchus.

THOMAS ALBERT PEPPARD.

THE WHITE ADRENAL LINE (SERGENT); IT'S CLINICAL SIGNIFICANCE: Williard Kay and Samuel Brock (Am. Jour. Med. Sc., April, 1921) The authors believe that the white adrenal line of Sergent is a local vasomotor disturbance residing in the skin, which has no specific relationship to adrenal gland activity. This observation was made after the careful study of 255 cases of normals and individuals sick with various conditions, upon whom they made numerous tests. Their reasons for assuming that the test is not specific for adrenal activity are:

(a) It's independence of blood pressure, acute fatigue, and other signs of deficiency of the adrenal bodies.

(b) On account of its frequent occurrence in normal individuals and diseases definitely unassociated with hypoadrenia.

(c) It's reappearance in spite of the persistent general manifestations of adrenalin administered subcutaneously.

(d) It's peculiar association with scarlet fever.

For these reasons they do not believe the line has the clinical significance attributed to it by the foreign writers, although they do not believe that any of the hypotheses evolved up to the present time establish the exact mechanism of this peculiar vasomotor phenomenon.

F. J. HIRSCHBOECK.

THE ABSORPTION OF ACACIA FROM THE PLEURAL CAVITY OF NORMAL AND TUBERCULOUS RABBITS: H. J. Corper and O. B. Rensch (Amer. Rev. of Tub., Mch., 1921, Vol. 5, No. 1). Feeling that the mechanism of the production of tuberculous pleural effusions and empyemas is far from being understood, experiments were conducted to investigate particularly the immunological factors contained therein.

Paterson found that normal guinea pigs gave no pleural response to intrapleural inoculations of tubercle bacilli and that tuberculous guinea pigs developed serous pleural effusion when so treated. He concluded that tuberculous pleural effusions are the result of infected allergic pleura.

Previous investigations of Corper and Rensch did not substantiate this theory, so the present study using a colloidal substance resembling in many particulars the proteins of pleural effusions, was done in order to supplement the previous work. Thirty-seven rabbits were used. The point to be determined was whether the absorption of 7 percent acacia in saline solution was influenced by the previous sensitization of the animals by tubercle bacilli or by the presence of tubercle bacilli in the acacia solution itself when administered intra pleurally to rabbits either normal of previously sensitized.

There was found to be no difference in the absorption of 7 percent acacia in saline solution with or without virulent tubercle bacilli, after intrapleural injection in normal and sensitized rabbits which tends to substantiate the previous observation that the tendency to pleural effusion is no greater in sensitized rabbits which have been given intrapleural injections of virulent tubercle bacilli.

Sensitized rabbits are not more prone to develop tuberculous pleural effusion than normal rabbits.

These findings do not agree with those of Paterson who used guinea pigs. This may account for the different findings. Further observation is necessary.

EVERETT K. GEER.

BLOOD SUGAR REGULATION AND THE ORIGIN OF THE HYPERGLYCEMIAS: Einar Langfeldt (Univ. Phy. Inst. Christiania, Jr. Bio. Chem. Vol. 46, No. 2, April, 1921). Glycogen Formation and Glycogenolysis.

Normal blood sugar concentration is from 0.09 to 0.10 percent with a physiological latitude between 0.07 to 0.11 percent. This blood sugar concentration is constant in normal individuals. Normal feeding does not cause any change. By administering glucose the concentration is increased rapidly within a few minutes, whereafter it quickly decreases to normal. It is agreed that the pancreas is necessary for glycogen formation in the liver.

Experimental work in normal dogs shows that alimentary hyperglycemia gives a rapid increase with a maximum in about one hour followed by a rapid fall. Glucose normally is rapidly converted into glycogen.

Postmortem and in vivo transformation of glycogen into glucose occurs as the result of a diastatic enzyme present in the liver.

Further experimental work has clearly demonstrated that small amounts of acids by mouth as well as by transfusion of the liver caused glycogenolysis, which was followed by hyperglycemia and glycosuria. Also that an increase of hydrogen in concentration in the blood of portal veins in depancreatized animals produced a heavy glycogenolysis, due to the failure of neutralization of gastric juice by alkaline pancreatic juice in these cases. Also in these dogs (depancreatized) the secretion of gastric juice itself, caused by giving water in boullion, was able to produce a considerable hyperglycemia.

II. Conditions of Action of Liver Diastases.

The following were proved by experiment:—

1. Pure diastase (free from chlorides) has no hydrolytic effect on glycogen in distilled water.
2. Phosphate diastase shows optimum activity at the pH 6.2 too far on the acid side to be important.
3. The optimum of the chloride diastase is found at pH 6.8.
4. The optimum action of the diastase after addition of adrenalin lies more on the alkali side.

5. Thyroiodine alone does not effect the distatic activity nor do the extracts of anterior or posterior lobes of hypophysis.
6. However simultaneous addition of adrenalin and thyroiodine have very strong effect.

III. **Theory.**

The hydrogen ion concentration of the tissue is probably a little less alkaline than pH 7.33 at 37°C, but still on the alkaline side of neutral. Under normal conditions the liver always discharges the same quantity of glucose.

The hydrogen ion concentration of the tissues is to the alkaline side. The optimum of cl. diastase is at neutral at 37°C. Therefore the blood sugar concentration when acids are given by mouth, the liver transfused, or by influence of gastric juice in depancreatized dogs is explained.

The second way in which hyperglycemia may arise is by displacement of the optimum of the liver diastase to or close to the hydrogen ion concentration of liver tissue. Such a displacement takes place under the influence of adrenalin or, in a higher degree, by simultaneous influence of adrenalin and thyroiodine.

Adrenalin alone when much diluted is inactive, but is very active when thyroiodine is added. This is shown clinically by the inactivity of subcutaneous injections of adrenalin in thyroidectomized dogs.

The third way in which a hyperglycemia may arise is by a lack in the formation of glycogen, such as takes place in pancreatic diabetes. In experimental diabetes there is not only a lack in glycogen formation but also undoubtedly an increased glycogenolysis in the liver on account of the absence of the neutralizing pancreatic juice.

ROBERT HELM KENNICOTT.

SURGERY

SUPERVISORS:
E. MENDELSSOHN JONES
LOWRY BLDG., ST. PAUL.
VERNE C. HUNT.
MAYO CLINIC, ROCHESTER.

OBSERVATION ON CANCER OF THE RECTUM: A. E. Wells, (Surg., Gynec., and Obst., 1920, 71, 472). Observations were made by the author on fifty-three patients most of whom were treated at the Hartford Hospital in the last twenty years. Twelve of this number came under his personal care. The patients were almost equally divided as to sex.

Figures argue that syphilis is not a cause of cancer. The greatest incidence of the disease occurred between the ages of sixty and eighty; the youngest patient was twenty-two. A diagnosis of cancer of the rectum at twenty-two might seem suspicious, yet it was proved beyond reasonable doubt. Another patient, male, aged thirty-one, had a tumor just within the anus involving the anterior and lateral walls of the rectum. A modified Kraske operation was done, the posterior wall of the rectum not being removed. In this way it is possible to avoid serious secondary stricture which always results when an end-to-end anastomosis is made at a point where the peritoneum covers only one side or none of the rectal wall. This patient was alive and well seventeen years after operation.

Mayo, in 1917, described the removal of localized papillomatous tumors of the large bowel and rectum by linear incision through the wall of the bowel by the abdominal route. Rowley, in 1914, removed through the anus by conservative methods a papillomatous tumor in a patient sixty years of age. Bevan describes a method by which he removes the coccyx and splits the rectum posteriorly from the anus to a distance of four inches. The tumor is removed by cautery. Several patients on whom this operation was performed are alive and well two and four years later.

It is evident, however, that before conservative surgery can be undertaken the location of the growth and the area involved should be determined accurately. In order to discover whether such a cancer is localized or not, the cystoscope as suggested by Hepburn may be used. A very perfect picture of the growth may be obtained, especially if the rectum is filled with water as in examination of the bladder.

The principal symptoms in these patients were pain, blood in the stools, loss of weight, obstruction, diarrhea, foul discharge, obvious tumor in the rectum, acute obstruction, incontinence of feses, piles urinary retention, and so forth. In six cases acute obstruction was the first symptom.

Colostomy is considered advisable, as it not only relieves obstruction, but also decreases the irritation of cancerous ulcer. A source of poisonous absorption is removed by draining the dilated colon proximal to the growth. Apparently inoperable growths occasionally become operable following colostomy and the operation should not be dreaded so much as previously. The procedure of choice is to make the opening almost as high as the navel, leaving a good loop of sigmoid and bringing the gut straight through the middle of the left rectus muscle.

In fourteen of the fifty-three cases radical surgery was attempted. Three patients operated on by the sacral route and one by the obdominal route made operative recoveries. Five operations combining the abdominal and sacral routes in two stages resulted in recovery. In five the two routes were combined in a single stage operation and all the patients died as a result of the operation. K. M. KOONS.

TUMORS OF THE KIDNEY: A Hyman (Surg., Gyn, & Ob., March, 1921.) In a series of forty cases of renal tumor, thirty-eight were malignant, the remaining two benign in character and confined to renal pelvis.

Hypernephroma was present in twenty-eight cases. It was most frequently found in the fourth and fifth decades. Its location, contrary to the former conception, was more often in the center or lower pole.

A peculiar characteristic in this series is the tendency of the tumor to break into the renal vein, occasionally extending into the vena cava. Metastases are usually multiple, secondary growths being found in the long bones, the bones of the skull and in the lungs and liver. The brain and spinal cord are not infrequently involved. These metastases may occur early or as late as ten years after nephrectomy.

The three cardinal symptoms of this type of renal tumor are first: hematuria, intermittent in type with a rather lengthy period between attacks, present in from fifty to seventy percent of cases; second: pain, which may be the initial symptom in from thirty to forty percent of cases; third: tumor, which is present in eighty-five percent of cases. General systemic manifestations are noteworthy in that they are of a much later development, coming on years after initial symptoms.

The diagnosis of this condition is greatly aided by cystoscopic, renal function and radiographic examinations which should include pyelograms and radiographs of the entire skeleton and lungs to determine presence of metastasis.

Treatment of this condition is nephrectomy at as early a date as is possible. The type of operation depending on the size of the tumor may be either trans-peritoneal or lumbar. The results in this series were a post-operative mortality of five percent in twenty nephrectomies; one death in eight exploratory operations. The percentage of cures after a period of three and a half years was thirty-three and a third percent.

Mixed tumors, eight in number, occurring for the most part in the early years of life under six years of age were composed of epithelial cells, muscle fibers, smooth and striated, cartilage, fat and bone. Clinical symptoms were primarily the large tumor, sometimes filling the entire abdominal cavity; pain and hematuria. Early nephrectomy is the only hope of cure.

The third type in this series, adeno-carcinoma, is of a more malignant variety, lasting only months instead of years. Pain is more constant, hematuria more pronounced and chaexia appears earlier. Of the two cases of this series, one died within a year, the other being alive and in good health after a year.

Tumors of the renal pelvis are rare. The papiloma, benign or malignant, does not infiltrate the kidney but are implanted along the ureter bladder. Symptoms in general are renal tumor, hydro-nephrosis or hemao-nephrosis. Diagnosis is obtained by microscopic examination of catheterized specimen, demonstration of implantation of tumor in bladder or distortion of pelvis as shown by pyelography. A single case of this type in this series was treated for papiloma of the bladder. The kidney condition was not diagnosed until post mortem.

The last case of this series was one of angioma of renal pelvis. Clinical symptoms were intermittent hematuria with lumbar pain of long duration. At operation entire pelvis and calyces were filled with the tumor. Nephrectomy was done with uneventful recovery.

In conclusion, of the total series of thirty-eight cases, eleven were inoperably malignant, twenty-seven nephorectomies with two operative deaths: twenty-three and three-tenths percent have passed the three and a half year period; fifty-eight percent died within two years after operation.

C. K. WILLIAMS.

LINES OF ADVANCE IN THE SURGERY OF BREAST CANCER: W. S. Handley (Brit. Med. Jour. 1921, 1, 37). Stiles showed that cancerous lymphatics are widely diffused through the breast. He emphasized the necessity of wide removal of pectoral fascia and deprecated the removal of an unnecessary amount of skin. The operation suggested by him and practiced by Cheyne from 1892 onward was much superior to that of Halstead. As Stiles studied only excised breasts he was unable to reach the correct conception of the mode of spread of cancer. The author, by working on postmortem subjects, demonstrated the centrifugal spread of mammary cancer in the fascial lymphatic plexus and detected, by the microscope, its growing edge at points far removed from the breast. The only explanation that fits these facts is the now generally accepted theory of permeation rather than the embolic theory of dissemination.

The subclavian glands may be involved before the lower axillary glands, on account of the occasional presence of a lymphatic trunk which passes from the mammary region through the pectoralis major. Recurrence, presented as a deep mass below the clavicle, is sometimes apparently adherent to the bone This type of recurrence is frequently seen by surgeons who do not dissect the axilla to its extreme apex. Operations are inadequate, in which only a portion of the breast has been removed for cancer, or the axillary dissection has not been made. The routine pathologic examination of every supposedly innocent tumor removed from the breast should never be omitted.

Operation was not refused in any case in which it was deemed possible to prolong the patient's life, or make the end of her life more comfortable. Forty-eight percent of the author's patients, who could be traced, were free of recurrence for three years. Recurrences in the scar and skin have been reduced to a low percentage. Isolated axillary recurrence, or recurrence in the region of the subclavian glands, has not been seen. Intrathoracic and hepatic recurrence was found in some cases, but the majority of recurrences were located in the supraclavicular and intercostal regions. The infrequency of local recurrence justifies the principles of the operation. The recurrences take place beyond the range of operation, either in the anterior mediastnal or the supraclavicular glands, and, less often, in the viscera. These structures may have been invaded at the time of the original operation.

Six patients recovered, in whom the primary operation was extended to include exploration of the

anterior mediastinum. In two cases the glands were found to be involved. One of these had widespread internal recurrence in six months, but the other was free from recurrence more than a year after operation.

Recurrence in the posterior triangle is seen just above the clavicle and below the posterior belly of the omophyoid muscle. In the earlier stages of recurrence in this region, the treatment is operative, but the operation must be thorough and systematic. If the cells have infiltrated the gland capsule and passed into the surrounding tissues, operative treatment is futile. Radium is useful preoperatively in these cases, as it reduces the risk of implantation of cancer cells on the raw surfaces.

Surgery has been supplemented for many years by postoperative x-ray radiation. It is now known that cancer cells can be killed by adequate radiation, and it is thus hoped that any remaining groups of cancer cells will be destroyed.

MERLE R. HOON.

THE DIFFERENTIATION OF SAPHENOUS VARIX FROM FEMORAL HERNIA: DeWitt Stetton (Surg. Gyn. and Ob., Vol. 32, No. 3) points out these aneurysmal dilatations of the upper part of the saphenous vein are regularly diagnosed and operated upon as femoral herniae even by very careful observers.

Points of differentiation:

(1). The bluish appearance is absent if the subcutaneous fat is at all pronounced.

(2). The compressibility is often just as marked in a hernia.

(3). The enlargement with the increase in venous pressure as in coughing, or the disappearance on lying down, are not very unlike the hernial impulse on straining, on the one hand, and the spontaneous reduction of the rupture in the recumbent position, on the other. The author states that he has seen a number of these cases in which either the error in diagnosis was deliberately made or where the diagnosis was doubtful until the lesion was exposed at operation.

In addition to the above points in differentiation which are brought out by DeQuervain the writer adds the following:

(1). The position of the swelling in the dilatation of the upper part of the saphenous vein is usually somewhat lower down than in the case of femoral hernia.

(2). As a rule other varicose veins will be found on the leg and thigh if a dilatation exists near the saphenous opening.

(3). Reduction of the tumor and pressure over the femoral ring by the examining finger does not hold back a saphenous varix which appears if the patient strains or stands.

(4). The impulse on coughing differs materially in both conditions. Instead of the frank impulse as in a hernia, there is, in the venous dilatation a fluid wave or thrill.

E. M. JONES.

GYNECOLOGY AND OBSTETRICS

SUPERVISORS:
ARCHIBALD L. McDONALD,
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TREATMENT OF ACUTE GONORRHOEA IN FEMALES: Block (Am. Jour. Med. Sc., Vol. 159, No. 4, P. 572). The author calls attention to the unsystematic treatment which these cases receive, and to the false impression that the disease is incurable. A routine is outlined which has given satisfactory results and is worthy of review.

In the early stage for the acute urethritic, rest is advised as much as can be obtained, large amounts of fluids often with saline diuretics, and a sedative mixture as the following; Tr. Hyocyamus, m v. Sodium bromide gr x. Liquor potassi Citratis zi. to the dose. Later local applications of silver nitrate are made to the urethra after careful drying with cotton applicators.

These are repeated every two or three days at first, then at longer intervals and continued till there have been three negative smears. The endocervicitis is more persistent. Douches of Potassium permanganate 1 to 8000, four or five times daily, are used for the first two weeks till the discharge lessens. Then local treatments following a definite routine: Careful exposure of the cervix through a bivalve is sprayed with an alkaline antiseptic solution, carefully cleansed and dried, then silver nitrate application followed by tincture of iodine. Two or three treatments a week are given for three weeks, then discontinue douches, and give fewer treatments, until three negative smears have been obtained. One of these should be taken immediately after a menstrual period.

ARCHIBALD L. McDONALD.

VARICOSE VEINS OF THE FEMALE PELVIS: Emge (Surg. Gyn. & Ob., Vol. 32, No. 2). After describing the anatomy of the pelvic veins, and comparing the structure and supports of the various groups, the author brings out the predisposing factors to this condition in the ovarian veins of the left side. Though other veins may be involved in late cases, the ovarians are the first and most extensively varicosed in most instances. Retroversion of the uterus with or without prolapse interferes with efficient venous drainage. Acquired primary varicose veins follow pelvic congestion which may have been due to pregnancy, ptosis, habitual constipation, or menstrual irregularities.

A vicious circle is established resulting in weakening of ligaments, displacement of uterus, and further congestion, Secondary effects include; small cystic ovaries, fibrous infiltration in the ovaries, thickening, congestion, or hypertrophy of endometrium, fibrosis of myometrium, and sterility. Symptoms, include: Pain low in abdomen more often to

the left, relieved when patient is off her feet, low backache, and dysmenorrhoea. Secondarily; gastric disturbances, or nervous indigestion. Local examination shows; marked tenderness in the cul-de-sac and a doughy mass, suggestive ectopic pregnancy. The mass and thickening are best felt with the patient in standing posture.

Treatment: 1. Non-operative, includes correction of malpostition by suitable pessary, copious douches, and rest.

Operative: excision of veins and correction of retroversion and prolapse.

ARCHIBALD L. McDONALD.

DOUBLE FLAP LOW CESAREAN SECTION: T. S. Welton (Am. Jour. of Ob. & Gyn., Vol 1, No. 4). The author reports 11 cases, 7 of which were potentially infected previous to operation, with no maternal mortality, and only six who showed any evidence of sepsis. 1 had been in labor more than 48 hours, 4 more than 24 hours, 3 more than 10 hours, and the rest were not in labor. Membranes had been ruptured in 7 for more than 10 hours, and all but one had been examined vaginally.

The essential points in technique were: low abdominal incision, transverse incision of peritoneum, stripping flaps from lower uterine segment, longitudinal incision in uterus, delivery of child and placenta, careful closure of uterine wound, then overlapping of peritoneal flaps to seal over uterine wound.

He concludes: 1. That the double flap and low caesarean section offers great protection against extension of infection to the peritoneum from the infected uterus.

2. For this reason the operation should be of service in all potentially infected cases.

3. For the same reason the field for caesarean section should be extended to cases long in labor, with ruptured membranes, and possible contamination, in preference to craniotomy.

4. The double flaps so completely peritonealize the uterus that adhesions and post-operative disturbances are rare.

5. Because of the results, obtained, and reasons given, this type of caesarean section should be preferred in elective cases.

ARCHIBALD L. McDONALD.

ROENTGENOLOGY

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X-RAY FINDINGS IN CHRONIC GAS CASES: Henry C. Pillsbury (Am. Jour. Roentg. Vol. 8, No. 4. p. 193, April 1921). The gases that leave behind them a chronic change in the lungs are chlorine, chloropicrine, and especially phosgene. Mustard gas is practically without effect on the lungs. The pathology in the lungs caused by these gases is similar, but presents certain points of difference.

Chlorine, the most irritant, affects the linig epithelium of the parts with which it first comes in contact—the trachea and larger bronchi. Chloropicrin, which must be broken up into a residue and HCL, only becomes effective after it has reached a part of the lung where moisture can be found—the medium sized and smaller bronchi. Here it causes the same lesions as chlorine. Phosgebe is a little more stable than chloropicrin, and is only broken up into HCL and its residue in the smaller bronchiloes and alveoli. A massive dose or prolonged exposure of phosgene or chloropicrin will affect the larger bronchi as well as the finer ones.

In chloropicrin cases, when the bronchiolar wall has been seriously damaged, an active proliferation of fibroblasts occurs, and the bronchial cavity becomes filled with granulation tissue; the final result is an obliterative bronchiolitis, with its consequent atelactasis or localized emphysema.

In phosvene cases, the linig epithelium is destroyed; later the epithelium regenerates, but there is a growth of granulation tissue in the walls of the finer bronchi which causes a thickening of the walls of the bronchi, and the peri-bronchitis. Occasionally the bronchus is entirely occluded and the end result is localized atelectasis and restricted areas of emphysema.

This condition is differentiated from early cases of pneumoconiosis in two particulars: the hilus shadow may not be enlarged, and there are no small areas of increased density to give the characteristic mottled appearance of dust inhalation.

The distribution, the uniformity, and the absence of areas of consolidation, suffice to establish the diagnosis from pulmonary tuberculosis.

R. G. ALLISON.

LEATHER BOTTLE STOMACH (LINITIS PLASTICA): Leon T. Lewald (Am. Jr. Roentg. Vol. 8., No. 4, p. 163 April 1921.). From roentgenologic observation of these cases, it appears that the peculiar type of stomach to which the term "leather-bottle" has been applied may represent anv one of three conditions; first, fibromatosis; second, syphilis; third, diffuse carcinoma. Despite the dif-

ficulty of attempting to differentiate by roentgen methods alone, it is, nevertheless, possible to distinguish these cases one from the other in a large enough proportion of cases at least to facilitate and augment clinical diagnosis; and in many instances it is possible to make an absolutely correct diagnosis when taken in conjunction with the Wassermann test.

The author presents in detail five cases, three of carcinoma, and one each of syphilis and fibromatosis of the stomach wall. The characteristics of a leather-bottle stomach are a diffuse or more or less circumscribed constriction of the stomach-wall a gaping pylorous associated with rapid emptying of the stomach and dilatation of the duodenum, and there is frequently also a moderate dilatation of the oesophagus.

LeWald states that the terms "linitis plastica" and "leather-bottle stomach" may well be retained as descriptive of this type of deformity of the stomach, but with a full appreciation of its triple nature.

R. G. ALLISON.

..REPORT OF THE CASE OF OSTEOPATHIA CONDENSES DISSEMINATA: Heinrich Wachtel. (Fort auf. d. Geb. d. Roentgenstr. Band 27, Heft6. Feb. 24, 1921. Page 624.) This structural anomaly was first described by Albers-Schonberg in 1915. He described a case with numerous small condensation areas in the spongiosa and compacta ef almost all the bones. The patella, vertebrae, skull, scapula, clavicle, as well as the diaphyses of the long bones were uninvolved. Two more cases have been reported, by Ledoux-Lebard, Chabaneix and Desanne in 1916, and more recently by Larrent-Moteau. The authors case was that of a twenty-three year old laborer. The roentgen examination was undertaken because of suspected arthritis of the sacro iliac joint. There was incidentally discovered this further condition which coincided exactly with the cases previously described, with the exception that the patella was also involved.

The etiology of this condition is not clear. Watchel calls attention to the fact that in all four cases the condensation areas in the epiphyses occupied of the bones is apt to establish itself. This is supposed to develope as bacterial emboli of small and arteries. In the cases described tais distribution in the skeleton of these areas seems to coincide with the point of embolus formation in the end arteries.

This conception affords a logical explanation for this phenomena as well as for the isolated condensed areas in the spongiosa which are commonly seen. Considering the unproved etiologg of this condition Wachtel suggests as a name for it, Ostel opathia Condensans Disseminata.

R. G. ALLISON.

A CONTRIBUTION TO KOHLER'S DISEASE OF THE OS NAVICULAR PEDIS IN CHILDREN: M. Behm, (Fort auf d. Geb. d. Roentgenstr. Band 27, Heft 6. Feb. 24, 1921.) Since Kohler published his observations in 1908 there has been practically no progress in determining the etiology of this condition. Stumme, Grune and Schultze have considered it to be a compression fracture; Haenisch, Preiser and Meulengracht have considered it the result of a traumatic disturbance of nourishment of the bone; while Kohler, Behm, and Wohlauer have maintained that it reprsented a disturbance of development sui generis.

The author's case, which roentgenologically presented the typical findings of Kohler's disease, presented clinically findings suggestive of infection and for this reason operative interference was decided upon. The cartilaginous form of the navicular was found to be normal without any flattening. The bony center was not red but presented a yellow color. This was found to be a dry, crumbly mass which was not only slightly adherent to the cartilage. This mass was removed and the wound closed.

The microscopic sections failed to show any evidence of spongiosa structure. The marrow showed a normal structure, it was permeated by delicate strands of connective tissue between which were blood vessel lumina which contained no blood cells. Distributed thru out the marrow were many structureless particles of necrotic tissue, which in part stained weakly with eosin, and which probably represented necrotic spongiosa. Osteoclasts were nowhere to be seen. The border of cartilage and bony center showed no attempt at calcification.

Thus the findings are those of an anaemic necrosis in the ossilcation centers and epiphyses of this patient showed that altho the boy was exceptionally well developed for 6¾ years, he had a bony developement of a 4 year old child.

Therstappen has undertaken to study on cats the effect of destroying the nourishing blood vessels of the navicular and lunate bones of the carpus. He found that an aseptic necrosis of the bone occured which corresponded exactly with the findings in this case of Kohlers disease.

The author believes that in his case of Kohlers disease that there was delay in the endochondral ossification beyond the normal limits which formed to a certin extent Locus minoris resestentiae. Then as the result of a disturbance of nourishment-perhaps incited thru trauma-there occured an aseptic necrosis of the bone in the ossification center of the navicular pedis. He suggests that in all cases of Kohlers disease there may be a delayed endochondral ossification.

R. G. ALLISON.

PEDIATRICS

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THE INFANT OF LOW BIRTH WEIGHT: ITS GROWTH AND DEVELOPMENT: Herman Schwarz, & Jerome L. Kohn,, Jour. of Dis. of Child, March 1921.) From 2 to 5 per cent. of all viable births result in children of low birth weight.

The mortality rate during the first month in this type of case is ten times that of the normal. The lower the birth weight, the greater the mortality. The mortality rate for the year in this type of case is four and one-half times the normal. In these children of low birth weight the mortality is twice as great in the premature as in the full term.

Twinning in the premature does not markedly affect the mortality rate.

In the full term, the single pregnancy has twice the chance for life as compared with the twin pregnancies.

The gain in weight during the first twelve months is at the same rate as that of the normal child so that the deficiency is not made up at the end of the first year. Twins do not act differently from those of single pregnancies.

The growth in length is not made up during the first twelve months. These children seem to attain the normal in length sooner than the normal of normal birth weight.

The general condition and mentality seems to be that of normal children through infancy and early childhood, although they have a greater tendency to anemia and rickets.

R. N. ANDREWS.

A POLYNEURITIC SYNDROME RESEMBLING PELLAGRAACRODYNIA SEEN IN VERY YOUNG CHILDREN: Albert H. Byfield, (Amer. Jour. of Dis. of Child., Nov., 1920.) During the past five years there appeared in this clinic, seventeen patients, all under four years of age, who have manifested a group of signs and symptoms out of the ordinary. The resemblance of their malady to pelagra was striking, but many points spoke against such a diagnosis.

The disease picture was a complex one, the nervous system and the skin being most involved, while the respiratory tract and the digestive tract appeared to be less affected. On the part of the nervous system the changes were chiefly sensory or trophic in character.

The skin manifestations were most uniform, and were quite definite. A symmetrical involvement of the fingers and toes, recurring at intervals was one of the most striking characteristics. The hands and the feet were cyanotic and cold, there appeared a non-confluent erythematous rash, most marked at the tips of the fingers and gradually diminishing until at the region of the wrist it had quite faded away. The feet were only slightly less involved than the hands. Never was there observed anything like the clear-cut line of demarcation as in pellagra. When the eruption appeared on the body it was usually accompanied with paresthesia. With the passing away of the body eruption, pigmented spots were sometimes left. The back of the neck was never seen to have any breaking out or scaling as in pellagra.

The puling out and falling out of the hair which was present in a number of cases and resulting sometimes in actual baldness, limited usually to the crown of the head. The loosening and falling out of the teeth was likewise a surprising manifestation and with it there was no adherent tissue, blood or exudate on the lost teeth. The nails were rarely involved. An extreme and obstinate anorexin was a prominent part of the picture. Many of the patients suffered extreme thirst. Frequency of urination was an almost uniform symptom and was often accompanied with pain. The duration of the trouble varied from two to eight months. The Wasserman test was negative.

From these findings it seems probable that we are dealing with a primary disease of the nervous system. The local manifestations point to the involvement of the fifth nerve. The paresthesia suggests a sensory nerve involvement and the coldness and blueness of the finger tips and toe tips point to a vasomotor disturbance.

A corrective diet, complete in every respect, supplying an adequate number of calories, sometimes introduced by gavage, was given and insisted upon, as the importance of feeding was the only evidence of possible relationship between food and the disease.

The trouble started with a bad cold and we are forced to regard the respiratory infection as more than a mere coincidence. We are not at this time, however, justified in completely ruling out the question of the existence of a deficiency disease.

What then, is this interesting disease? Weston states that we are dealing with acrodynia or epidemic erythema. It has been suggested that we are dealing with a sequel of influenza so that the disease described is a post influenzal acrodynia or sensory polyneuritis.

Treatment: The marked emaciation which is the result of persistent aversion for food calls for vigorous treatment. Gavage should be resorted to if necessary. This is the mainstay of the therapy and often brings relief.

BOOK REVIEWS

PHYSICAL DIAGNOSIS, W. D. Rose, M. D. C. V. Mosby Co. 2nd Edition. 1921. $8.50.

The second edition of this work contains seven hundred and thirty-six pages with three hundred illustrations.

The standard methods of physical diagnosis are given in a clear concise manner.

It would seem that a re-arrangement of the contents might not be out of place. The section on "Head and Neck" comes last. Logically, it should come first. EVERETT K. GEER.

PRACTICAL TUBERCULOSIS. .Herbert F. Gammons, M. D. C. V.. Mosby Company. $2.00.

This is a small book on one hundred fifty-eight pages and is written for the general practioner and those interested in tuberculosis.

For the physician it seems somewhat sketcky and for the layman too technical. No doubt, however, both would be improved by reading it.

EVERETT K. GEER

A PHYSICAL INTERPRETATION OF SHOCK, EXHAUSTION, AND RESTORATION. George W. Crile. Oxford Medical Publications. 1921.

The author presents this work to the profession as summaries of researches which he has conducted both in Cleveland and in France.

The theories proposed for the explanation of shock and exhaustion are discussed. The mechanism involved in shock exhaustion and restoration is considered and its relation to the principles formed is dealt with in detail.

The volumne abounds in blood pressure tracings and photomicrographs.

After reading the book one is forced to agree with Dr. Crile that, "with such evidence of the practical value of bio-physical methods of attack upon clinical problems, it would seem that with medicine may approach a place among the exact physical sciences, and the physician may attack his problems from the more secure standpoint of the physicist." EVERETT K. GEER.

PRACTICAL PSYCHOLOGY AND PSYCHIATRY, BY C. B. BURR, M. D. FIFTH EDITION, F. A. DAVIS COMPANY, PHILADELPHIA, PA. PRICE

When I was about fifteen years of age I visited a gypsy camp on the edge of town. A pretty little girl wanted to tell my fortune. I refused but she insisted, adding that for twenty-five cents she would show me something which I had always seen and something which I would never see. Being of a naturally curious turn of mind I at last gave her the quarter. She took my hand and pointed out to me that my middle finger was longer than my index finger, that she said I had always seen but my index finger was shorter than my middle finger and I would never see it longer than the middle one. Dr. Burr has succeeded in pointing out many curious circumstances about our mind in an interesting manner in his chapters on pyschology. He has used many homely and understandable similes to illustrate the subjects which the larger and more elaborate texts on the subject make very complicated and obtuse. Sometimes giving them interpretations of his own and arrousing our interest much as the gypsy girl aroused mine. With such a comprehensible summary of psychology before us, he attacks psychiatry and again, by the use of illustrative cases succeeds in clarifying his subject matter. He has followed the classification of the National Committee of Mental Hygiene rather closely, but by many well-thought-out observations has made it exceedingly simple. His new chapter upon the prevention of insanity is unfortunately a little weak. There are undoubtedly many helpful hints in the case and upbringing of children in it. By their guidance in early years he points out how many of the bad habits of later years may be nipped. When, however, he deplores the present day games and past-preceding generation, he simply criticizes without taking into consideration the progress and changes in our present day mode of living.

Judging the book as whole production, it is, as the title implies practical, and I would add—interesting. FRANK W. WHITMORE.

TUBERCULOSIS OF CHILDREN. Prof. Dr. Hans Much, University of Hamburg, Germany, English translation by Dr. Max Rothschild. The MacMillan Company. 1921. Price $2.50.

This book is divided into a "general" and a "special" part. In the first section the author type of the human and bovine tubercle bacillus. He believes a transition from one type to the other is possible and therefore, of supreme importance. Adaption to their respective hosts the author believes to be responsible for their different characteristics.

The theory of Von Behring that "wherever tuberculosis is found, it has started in the first years of childhood, and that during this age most people pass through a tuberculous infection" is strongly upheld by the author.

The chapter on immunity is very instructive but contains nothing new.

In dealing with the development of tuberculosis Much states that our anti-tuberculosis campaign has been entirely wrong. He would treat the tuberculosis in children and claims that nothing has been done along that line so far.

As to the treatment of tuberculosis in children the author advocates the "non-specific" measures, sun, fresh air, hygiene, dietetic measures, X-ray, etc.; his "specific" treatment consists of injections of "partial antigens" or "partigens" so-called. There are three of these "partigens" which are non-soluble in water, albumen, fat-acidlipoid, and neutral fat. The water soluble "partigens" are harmful and are found in all tuberculins.

The second or special part of the book is de-

voted to the diagnosis and treatment of tuberculosis in children. The point is emphasized and rightly so, that even our so-called incipient pulmonary tuberculosis is really a far-advanced expression of the tuberculosis we acquired in childhood. The time to effectually cure the disease is in childhood.

The X-ray is the most important aid for diagnosis according to Much. D'Espines sign paravertebral dullness and the toxic symptoms are also of inestimiable importance.

The use of "partigens" is the only new departure in the book. We have only the authors word that they are efficacious; no case reports nor other substantiating data.

The chapters on Infection, Immunity, Diagnosis etc., are quite in accordance with American ideas.

EVERETT K. GEER.

ANAESTHETICS. Dudley Wilmot Buxton. H. K. Lewis & Co., Ltd. (London). 1920. Sixth Edition. Price $6.00.

The sixth edition of this work has been revised and some sections rewritten. Anaesthesia of all kinds, ether, chloroform, nitrous oxide, local anesthesia, spinal anesthesia, etc., are dealt with in detail. It is an exceedingly valuable book and should be carefully read by all who administer anesthetics of any nature.

EVERETT K. GEER

A GENERAL INTRODUCTION TO PSYCHANALYSIS BY PROF. SIGMUND FREUD, L. L. D. AUTHORIZED TRANSLATION WITH A PREFACE BY G. STANLEY HALL, PRESIDENT CLARK UNIVERSITY, BONI AND LIVERIGHT PUBLISHERS, NEW YORK. ....

As the distinguished psychologist Stanley Hall says in his preface: "Few, especially in this Country, realize that while Freudian themes have rarely found a place on the programs of the American Psychological Association, they have attracted great and growing attention and found frequent elaboration by students of literature, history, biography, sociology, morals and aesthetics. anthropology, education and religion."

Freud divides his book into three parts comprising twenty-eight lectures; he points out the great difficulties of psychonanlysis and frankly d.scourages disciples from taking it up. Somewhat bitterly he points out that a psychoanalyst is subjected to social and professional ostracism; it seems as though everything new must pass through a veritable test by fire before being accepted, and psychoanalysis is no exception. Lectures number two, three and four deal with that interesting by-product of psychoanalysis the psychology of errors, and show by examples and deduction that slips of the tongue, mislaying objects, forgetting names, etc., are valid psychic acts with intention in the background. Lectures five to fifteen inclusive take up dreams and maintain that dreams are wish fulfillments appearing in the form of symbolic manifest dreams, which, when analyzed, reveal the wish in the latent dream. Freud says that there is no other field in which one can so quickly be convinced of the correctness of the assertions by which psychoanaysis stands or falls, as by investigation of the dream problem.

The succeeding lectures deal with the neuroses, psychonanalysis and psychiatry, the meaning and development of symptoms, libido, transference, fear and anxiety, the unconscious, suppression, ordinary nervousness, and a final chapter on analytical theraphy in which the author disclaims any desire to teach the technique of psychoanalysis in this book.

The whole work is a philosophical consideration of the psychology of various disorders, and a demonstration of the origin of these because of a conflict between sex urge and a personality built up by social environment resulting in suppression and vicarious gratification; the cure by psychonanalysis consists in discovering to the patient the origin and meaning of his malady; in other words, of rendering conscious that which was unconscious. The book is more than this, it is a defense of psychoanalysis which he calls an unfinished thing still in the process of development; he divides the mind into the conscious, the fore-conscious and the unconscious; certainly no single human being has ever contributed as much to psychology as has Freud and particularly by his masterly studies of the unconscious.

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